DEPARTMENT OF THE NAVY
FISCAL YEAR (FY) 2002
AMENDED BUDGET SUBMISSION

JUSTIFICATION OF ESTIMATES
JUNE 2001

RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY
BUDGET ACTIVITY 4

DEPARTMENT OF DEFENSE

FY 2002 RDT&E PROGRAM

SUMMARY
($ IN THOUSANDS)

JUNE 2001

APPROPRIATION	FY 2000	FY 2001	FY 2002
Research, Development, Test & Eval, Navy	9,064,511	9,458,007	11,123,389
Total Research, Development, Test & Evaluation	9,064,511	9,458,007	11,123,389

DEPARTMENT OF DEFENSE

FY 2002 RDT&E PROGRAM

SUMMARY
($ IN THOUSANDS)

JUNE 2001

Summary Recap of Budget Activities	FY 2000	FY 2001	FY 2002
Basic Research	367,129	393,835	406,120
Applied Research	610,404	659,154	626,550
Advanced Technology Development	739,492	786,425	680,500
Demonstration and Validation	2,353,009	2,557,636	2,414,880
Engineering and Manufacturing Development	2,225,926	2,214,621	4,122,698
RDT&E Management Support	810,339	651,178	738,841
Operational Systems Development	1,958,212	2,195,158	2,133,800
Total Research, Development, Test & Evaluation	9,064,511	9,458,007	11,123,389

Summary Recap of FYDP Programs			
Strategic Forces	92,729	84,953	82,614
General Purpose Forces	964,735	885,771	829,774
Intelligence and Communications	736,160	867,632	824,611
Guard and Reserve Forces		5,863	13,082
Research and Development	7,129,776	7,495,719	9,269,069
Central Supply and Maintenance	132,808	118,069	104,239
Administration and Associated Activities	8,303		
Total Research, Development, Test & Evaluation	9,064,511	9,458,007	11,123,389

DEPARTMENT OF THE NAVY

FY 2002 RDT&E PROGRAM

SUMMARY
($ IN THOUSANDS)

JUNE 2001

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DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
1	0601152N	In-House Laboratory Independent Research	1	15,262	16,193	16,291	U
2	0601153N	Defense Research Sciences	1	351,867	377,642	389,829	U
	Basic Research			367,129	393,835	406,120	
3	0602111N	Air and Surface Launched Weapons Technology	2	54,629	54,957		U
4	0602114N	Power Projection Applied Research	2			66,322	U
5	0602121N	Ship, Submarine & Logistics Technology	2	60,710	56,291		U
6	0602122N	Aircraft Technology	2	21,759	20,864		U
7	0602123N	Force Protection Applied Research	2			117,072	U
8	0602131M	Marine Corps Landing Force Technology	2	17,233	12,180	31,248	U
9	0602232N	Communications, Command and Control, Intelligence, Surveilla	2	83,113	113,851		U
10	0602233N	Human Systems Technology	2	33,717	40,068		U
11	0602234N	Materials, Electronics and Computer Technology	2	101,725	102,377		U
12	0602235N	Common Picture Applied Research	2			83,557	U
13	0602236N	Warfighter Sustainment Applied Research	2			71,294	U
14	0602270N	Electronic Warfare Technology	2	34,412	25,804		U
15	0602271N	RF Systems Applied Research	2			62,141	U
16	0602314N	Undersea Warfare Surveillance Technology	2	47,540	52,898		U
17	0602315N	Mine Countermeasures, Mining and Special Warfare	2	44,159	50,397		U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
18	0602435N	Ocean Warfighting Environment Applied Research	2	66,642	76,363	50,738	U
19	0602633N	Undersea Warfare Weaponry Technology	2	37,127	40,652		U
20	0602747N	Undersea Warfare Applied Research	2			76,510	U
21	0602782N	Mine and Expeditionary Warfare Applied Research	2			57,668	U
22	0602805N	Dual Use Science and Technology Program	2	7,638	12,452	10,000	U
	Applied Research			610,404	659,154	626,550	
23	0603114N	Power Projection Advanced Technology	3			76,410	U
24	0603123N	Force Protection Advanced Technology	3			85,297	U
25	0603217N	Air Systems and Weapons Advanced Technology	3	47,825	60,592		U
26	0603235N	Common Picture Advanced Technology	3			48,583	U
27	0603236N	Warfighter Sustainment Advanced Technology	3			57,685	U
28	0603238N	Precision Strike and Air Defense Technology	3	84,946	86,752		U
29	0603270N	Advanced Electronic Warfare Technology	3	20,361	17,361		U
30	0603271N	RF Systems Advanced Technology	3			76,876	U
31	0603508N	Surface Ship & Submarine HM&E Advanced Technology	3	78,230	72,758		U
32	0603640M	Marine Corps Advanced Technology Demonstration (ATD)	3	66,432	60,687	51,310	U
33	0603706N	Medical Development	3	73,821	84,823		U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
34	0603707N	Manpower, Personnel and Training Adv Tech Dev	3	38,370	45,566		U
35	0603712N	Environmental Quality and Logistics Advanced Technology	3	24,682	48,129		U
36	0603727N	Navy Technical Information Presentation System	3	42,300	51,033	118,802	U
37	0603729N	Warfighter Protection Advanced Technology	3			17,678	U
38	0603747N	Undersea Warfare Advanced Technology	3	56,535	66,182	56,303	U
39	0603758N	Navy Warfighting Experiments and Demonstrations	3			43,277	U
40	0603782N	Mine and Expeditionary Warfare Advanced Technology	3	57,077	48,172	48,279	U
41	0603792N	Advanced Technology Transition	3	106,018	99,116		U
42	0603794N	C3 Advanced Technology	3	42,895	45,254		U
		Advanced Technology Development		739,492	786,425	680,500	
43	0603207N	Air/Ocean Tactical Applications	4	28,441	32,536	32,332	U
44	0603216N	Aviation Survivability	4	13,622	7,458	25,572	U
45	0603237N	Stall/Spin Inhibitors (H)	4			50,000	U
46	0603254N	ASW Systems Development	4	19,657	27,409	12,922	U
47	0603261N	Tactical Airborne Reconnaissance	4	1,956	2,332	1,934	U
48	0603382N	Advanced Combat Systems Technology	4	6,547	6,879	3,458	U
49	0603502N	Surface and Shallow Water Mine Countermeasures	4	107,938	101,984	135,284	U
50	0603506N	Surface Ship Torpedo Defense	4	6,092	15,853	4,818	U
51	0603512N	Carrier Systems Development	4	134,194	149,549	165,150	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
52	0603513N	Shipboard System Component Development	4	108,548	256,065	288,382	U
53	0603525N	PILOT FISH	4	96,019	106,611	99,600	U
54	0603527N	RETRACT LARCH	4	7,568	11,786	50,441	U
55	0603536N	RETRACT JUNIPER	4	5,980			U
56	0603542N	Radiological Control	4	585	567	1,056	U
57	0603553N	Surface ASW	4	6,723	6,690	3,724	U
58	0603559N	SSGN Coversion	4		37,416	30,000	U
59	0603561N	Advanced Submarine System Development	4	127,615	128,082	110,766	U
60	0603562N	Submarine Tactical Warfare Systems	4	4,352	4,317	5,405	U
61	0603563N	Ship Concept Advanced Design	4	31,995	5,115	1,949	U
62	0603564N	Ship Preliminary Design & Feasibility Studies	4	9,969	56,374	14,922	U
63	0603570N	Advanced Nuclear Power Systems	4	145,355	166,938	175,176	U
64	0603573N	Advanced Surface Machinery Systems	4	25,685	9,547	3,921	U
65	0603576N	CHALK EAGLE	4	89,512	64,176	35,313	U
66	0603582N	Combat System Integration	4	76,800	54,461	42,915	U
67	0603609N	Conventional Munitions	4	37,665	33,310	22,299	U
68	0603611M	Marine Corps Assault Vehicles	4	110,937	147,100	263,066	U
69	0603635M	Marine Corps Ground Combat/Support System	4	47,331	32,416	25,957	U
70	0603654N	Joint Service Explosive Ordnance Development	4	10,821	14,546	12,918	U
71	0603658N	Cooperative Engagement	4	182,307	177,612	74,231	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
72	0603713N	Ocean Engineering Technology Development	4	15,058	15,230	16,077	U
73	0603721N	Environmental Protection	4	79,565	65,506	46,117	U
74	0603724N	Navy Energy Program	4	6,719	7,869	5,025	U
75	0603725N	Facilities Improvement	4	1,927	1,807	1,728	U
76	0603734N	CHALK CORAL	4	39,402	52,401	48,187	U
77	0603739N	Navy Logistic Productivity	4	17,428	12,880	11,735	U
78	0603746N	RETRACT MAPLE	4	118,066	122,572	148,856	U
79	0603748N	LINK PLUMERIA	4	47,924	41,983	62,601	U
80	0603751N	RETRACT ELM	4	21,233	13,417	22,200	U
81	0603755N	Ship Self Defense - Dem/Val	4	9,628	6,550	8,353	U
82	0603764N	LINK EVERGREEN	4	7,812	9,623	26,151	U
83	0603787N	Special Processes	4	68,013	61,936	58,858	U
84	0603790N	NATO Research and Development	4	5,118	8,909	11,551	U
85	0603795N	Land Attack Technology	4	129,300	138,956	130,993	U
86	0603800N	Joint Strike Fighter (JSF) - Dem/ Val	4	238,420	240,820		U
87	0603851M	Nonlethal Weapons - Dem/Val	4	25,827	29,309	34,008	U
88	0603857N	All Service Combat Identification Evaluation Team (ASCIET)	4	13,898	12,989	13,530	U
89	0603879N	Single Integrated Air Picture (SIAP) System Engineer (SE)	4		20,000	43,140	U
90	0603889N	Counterdrug RDT&E Projects	4	24,091			U
91	0604327N	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	4	4,591			U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
92	0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	4	34,775	37,750	32,259	U
		Demonstration and Validation		2,353,009	2,557,636	2,414,880	
93	0603208N	Training System Aircraft	5	295			U
94							
95	0604212N	Other Helo Development	5	72,173	36,024	64,392	U
96	0604214N	AV-8B Aircraft - Eng Dev	5	36,410	28,654	32,897	U
97	0604215N	Standards Development	5	74,391	100,740	120,552	U
98	0604216N	Multi-Mission Helicopter Upgrade Development	5	110,097	83,115	149,418	U
99	0604217N	S-3 Weapon System Improvement	5	4,918	450	428	U
100	0604218N	Air/Ocean Equipment Engineering	5	5,733	5,995	6,346	U
101	0604221N	P-3 Modernization Program	5	10,531	7,333	3,220	U
102	0604231N	Tactical Command System	5	44,510	59,242	64,832	U
103	0604234N	Common Strategic Rotary Launcher (H)	5			96,000	U
104	0604235N	Cruise Missile Surveillance Sensors (H)	5			388,496	U
105	0604245N	H-1 Upgrades	5	178,524	138,189	170,068	U
106	0604261N	Acoustic Search Sensors	5	24,782	20,545	16,825	U
107	0604262N	V-22A	5	175,919	146,589	546,735	U
108	0604264N	Air Crew Systems Development	5	17,412	28,672	7,717	U
109	0604270N	EW Development	5	208,163	133,399	112,473	U
110	0604300N	SC-21 Total Ship System Engineering	5	160,894	289,591	355,093	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
111	0604307N	Surface Combatant Combat System Engineering	5	240,898	200,330	262,037	U
112	0604311N	LPD-17 Class Systems Integration	5	2,387	270	1,001	U
113	0604312N	Tri-Service Standoff Attack Missile	5	1,913	3,503	1,946	U
114	0604366N	Standard Missile Improvements	5	625	1,183	1,309	U
115	0604373N	Airborne MCM	5	51,103	50,842	52,041	U
116	0604503N	SSN-688 and Trident Modernization	5	70,764	72,132	43,706	U
117	0604504N	Air Control	5	14,537	13,394	12,821	U
118	0604507N	Enhanced Modular Signal Processor	5	871	867	1,013	U
119	0604512N	Shipboard Aviation Systems	5	8,675	9,627	16,375	U
120	0604518N	Combat Information Center Conversion	5	7,715	3,686	5,392	U
121	0604524N	Submarine Combat System	5	9,184	3,609		U
122	0604528N	SWATH (Small Waterplane Area Twin Hull) Oceanographic Ship	5	8,690			U
123	0604558N	New Design SSN	5	236,660	212,127	201,596	U
124	0604561N	SSN-21 Developments	5	30,505	6,557	5,770	U
125	0604562N	Submarine Tactical Warfare System	5	12,556	26,249	29,246	U
126	0604567N	Ship Contract Design/ Live Fire T&E	5	57,901	77,488	130,388	U
127	0604574N	Navy Tactical Computer Resources	5	56,160	30,608	3,836	U
128	0604601N	Mine Development	5	3,276	1,635		U
129	0604603N	Unguided Conventional Air-Launched Weapons	5	2,836	2,553	12,890	U
130	0604610N	Lightweight Torpedo Development	5	8,984	9,262	10,310	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
131	0604618N	Joint Direct Attack Munition	5	10,800	28,845	56,285	U
132	0604654N	Joint Service Explosive Ordnance Development	5	6,870	7,037	8,123	U
133	0604703N	Personnel, Training, Simulation, and Human Factors	5	1,240	1,259	1,300	U
134	0604710N	Navy Energy Program	5	5,236	5,480	3,157	U
135	0604721N	Battle Group Passive Horizon Extension System	5	1,663	2,211	8,130	U
136	0604727N	Joint Standoff Weapon Systems	5	28,920	27,694	26,852	U
137	0604755N	Ship Self Defense - EMD	5	129,872	114,514	52,163	U
138	0604756N	Advanced Distributed Learning	5			33,530	U
139	0604757N	Medical Chemical Defense Life Material (H)	5			41,670	U
140	0604771N	Medical Development	5	15,274	27,519	5,455	U
141	0604777N	Navigation/ID System	5	16,395	18,314	23,884	U
142	0604784N	Distributed Surveillance System	5	39,077	30,924	34,711	U
143	0604800N	Joint Strike Fighter (JSF) - EMD	5		100,344	767,259	U
144	0604805N	Commercial Operations and Support Savings Initiative	5	19,587			U
145	0604910N	Smart Card	5		1,228	896	U
146	0605013M	Information Technology Development	5		6,770	11,031	U
147	0605013N	Information Technology Development	5		32,159	49,333	U
148	0605014N	Defense Integrated Military Human Resources System (DIMHRS) - RDT&E	5			47,184	U
149	0605015N	Joint Counter-Intelligence Assessment Group (JCAG) - RDT&E	5			6,000	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
150	0508713N	Navy Standard Integrated Personnel System (NSIPS)	5		5,863	13,082	U
		Engineering and Manufacturing Development		2,225,926	2,214,621	4,122,698	
151	0604256N	Threat Simulator Development	6	27,702	25,934	30,110	U
152	0604258N	Target Systems Development	6	51,592	40,699	49,511	U
153	0604759N	Major T&E Investment	6	45,267	45,227	41,804	U
154	0605152N	Studies and Analysis Support - Navy	6	6,114	5,997	6,679	U
155	0605154N	Center for Naval Analyses	6	42,521	43,487	44,891	U
156	0605155N	Fleet Tactical Development	6	2,948	2,715	2,912	U
157	0605502N	Small Business Innovative Research	6	143,492			U
158	0605804N	Technical Information Services	6	10,047	10,848	951	U
159	0605853N	Management, Technical & International Support	6	16,646	17,481	21,628	U
160	0605856N	Strategic Technical Support	6	2,302	2,381	2,391	U
161	0605861N	RDT&E Science and Technology Management	6	54,851	52,877	54,825	U
162	0605862N	RDT&E Instrumentation Modernization	6	9,218	11,935	11,601	U
163	0605863N	RDT&E Ship and Aircraft Support	6	72,181	75,341	71,735	U
164	0605864N	Test and Evaluation Support	6	264,958	270,214	277,414	U
165	0605865N	Operational Test and Evaluation Capability	6	9,344	8,874	11,649	U
166	0605866N	Navy Space and Electronic Warfare (SEW) Support	6	1,955	3,232	3,433	U
167	0605867N	SEW Surveillance/Reconaissance Support	6	10,975	11,586	12,693	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
168	0605873M	Marine Corps Program Wide Support	6	29,923	17,727	9,614	U
169	0305885N	Tactical Cryptologic Activities	6		4,623	85,000	U
170	0909999N	Financing for Cancelled Account Adjustments	6	8,303			U
		RDT&E Management Support		810,339	651,178	738,841	
171							
172							
173							
174	0604227N	HARPOON Modifications	7	300			U
175	0604805N	Commercial Operations and Support Savings Initiative	7		8,372		U
176	0101221N	Strategic Sub & Weapons System Support	7	57,292	53,195	43,322	U
177	0101224N	SSBN Security Technology Program	7	31,580	30,887	34,091	U
178	0101226N	Submarine Acoustic Warfare Development	7	3,857	871	996	U
179	0101402N	Navy Strategic Communications	7			4,205	U
180	0204136N	F/A-18 Squadrons	7	307,589	234,490	253,257	U
181	0204152N	E-2 Squadrons	7	38,694	44,890	20,583	U
182	0204163N	Fleet Telecommunications (Tactical)	7	11,790	11,902	21,136	U
183	0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	7	137,445	90,461	76,036	U
184	0204311N	Integrated Surveillance System	7	16,908	37,084	20,041	U
185	0204413N	Amphibious Tactical Support Units	7		11,837	24,387	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
186	0204571N	Consolidated Training Systems Development	7	36,853	36,774	22,407	U
187	0204575N	Electronic Warfare (EW) Readiness Support	7	8,678	9,833	7,659	U
188	0205601N	HARM Improvement	7	36,773	39,409	13,630	U
189	0205604N	Tactical Data Links	7	42,706	26,005	39,362	U
190	0205620N	Surface ASW Combat System Integration	7	22,544	29,314	28,119	U
191	0205632N	MK-48 ADCAP	7	19,400	15,707	17,130	U
192	0205633N	Aviation Improvements	7	48,959	50,475	41,430	U
193	0205658N	Navy Science Assistance Program	7			4,945	U
194	0205667N	F-14 Upgrade	7	1,354	11,122		U
195	0205675N	Operational Nuclear Power Systems	7	52,880	52,945	55,202	U
196	0206313M	Marine Corps Communications Systems	7	89,355	107,102	104,835	U
197	0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	7	29,020	39,061	43,935	U
198	0206624M	Marine Corps Combat Services Support	7	11,852	3,876	8,483	U
199	0207161N	Tactical AIM Missiles	7	38,872	21,473	16,402	U
200	0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	7	13,063	12,011	10,795	U
201							
202							
203	0303109N	Satellite Communications (SPACE)	7	40,015	39,413	54,230	U
204	0303140N	Information Systems Security Program	7	20,105	31,835	20,942	U

DEPARTMENT OF THE NAVY
FY 2002 RDT&E PROGRAM

EXHIBIT R-1

APPROPRIATION: 1319N Research, Development, Test & Eval, Navy

Date: JUNE 2001

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 2000	FY 2001	FY 2002	SEC
205							
206	0305160N	Navy Meteorological and Ocean Sensors-Space (METOC)	7	18,202	19,549	23,492	U
207	0305188N	Joint C4ISR Battle Center (JBC)	7	8,045	9,705	13,618	U
208	0305192N	Joint Military Intelligence Programs	7	1,994	6,936	7,179	U
209	0305204N	Tactical Unmanned Aerial Vehicles	7	75,029	121,753	66,349	U
210	0305206N	Airborne Reconnaissance Systems	7	18,779	26,135	5,736	U
211	0305207N	Manned Reconnaissance Systems	7	39,582	46,014	29,232	U
212	0305208N	Distributed Common Ground Systems	7	5,530	4,434	4,467	U
213	0305927N	Naval Space Surveillance	7	1,685	1,425	4,237	U
214	0308601N	Modeling and Simulation Support	7	10,920	13,976	7,828	U
215	0702207N	Depot Maintenance (Non-IF)	7	42,822	39,802	13,569	U
216	0708011N	Industrial Preparedness	7	69,474	68,987	70,605	U
217	0708730N	Maritime Technology (MARITECH)	7	20,512	9,280	20,065	U
		Operational Systems Development		1,958,212	2,195,158	2,133,800	
		Total Research, Development, Test & Eval, Navy		9,064,511	9,458,007	11,123,389	

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION Date: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & Title	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X2341 METOC Data Acquisition	8,066	8,676	9,180						CONT.	CONT.
X2342 METOC Data Assimilation and Modeling	11,711	14,659	13,591						CONT.	CONT.
X2343 Tactical METOC Applications	7,280	7,755	8,056						CONT.	CONT.
X2344 Precise Timing and Astrometry	1,384	1,446	1,505						CONT.	CONT.
TOTAL	28,441	32,536	33,332						CONT.	CONT.

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION Date: June 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Air Ocean Tactical Applications (AOTA) Program Element is specifically tailored to emphasize techniques which expand knowledge and improve understanding of the meteorological and oceanographic (METOC) environment and its impact on combat systems performance. AOTA focuses on shallow water and other harsh environments, and regional conflict and crisis response scenarios. Projects in this program element develop atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in both mainframe and tactical scale computers. Global Geospatial Information and Services efforts within this program address the bathymetric and gravimetric needs of the Navy. Also developed are algorithms to process remotely sensed satellite data for integration into other systems and tactical applications. In addition, the projects provide for demonstration and validation of specialized METOC instrumentation and measurement techniques, new sensors, communications and interfaces. Included are techniques to assess, predict and enhance the performance of current and proposed undersea surveillance, tactical and mine warfare and weapons systems. AOTA METOC products are tailored for, and will be incorporated into the Global Command and Control System/Maritime (GCCS/M) and/or onboard combat systems to provide accurate operational system performance predictions. These METOC products will also be incorporated into fleet trainers to provide realistic environments in support of warfare simulations. Finally, this project upgrades the accuracy of the U.S. Naval Observatory's Master Clock system; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates systems for experimental test related to specific ship or aircraft applications.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

PROJECT NUMBER & Title	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X2341 METOC Data Acquisition										
	8,066	8,676	9,180						CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The major thrust of the meteorology and oceanography (METOC) Data Acquisition Project is to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander. As the emphasis on Naval Warfare has evolved from blue water operations to the littoral and hinterland battlespace, METOC data requirements have likewise evolved. The littoral and hinterland regions are extremely dynamic and complex, characterized by strong and highly variable oceanographic and atmospheric conditions. As a result, the need to accurately characterize these parameters is more crucial than ever in planning and executing Amphibious Warfare, Mine Warfare, Special Operations, Anti-Submarine Warfare, and Strike Warfare operations. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models, and satellite remote sensing are inadequate to support these warfare areas in the littoral and hinterland regions. Current operational sensors, such as the standard balloon launched radiosonde, are deployed from platforms that are frequently located great distances from the area of interest. The principal challenge is to provide a means for the collection and dissemination of METOC data in highly variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time. The principal goals of this project are to: 1) Provide the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provide an on-scene assessment capability for the tactical commander; 3) provide the tactical commander with real-time METOC data and products for operational use; 4) demonstrate and validate the use of tactical workstations and desktop computers for processing and display of METOC data and products using latest networking technologies; 5) demonstrate and validate techniques which employ data compression, connectivity and interface technologies to ingest, store, process, distribute and display these METOC data and products; 6) develop new charting and bathymetric survey techniques necessary to reduce the

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

existing 300 ship year shortfall in coastal hydrographic survey requirements; and, 7) develop an expanded database for predictive METOC models in areas of potential interest.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1.(U) FY 2000 ACCOMPLISHMENTS:

- (U) ($1,121) Completed integration of MEASURE Interface Processor (MIP) into airborne unmanned vehicles (UAV's). Continued development of Battlespace characterization techniques to measure environmental data in-situ and transmit to Fleet assets.
- (U) ($1,266) Continued sensor developments for ROV/AUV, and continued sensor integration and development of UAV sensors in Tier II Plus Vehicles.
- (U) ($1,050) Continued assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
- (U) ($920) Began development of advanced techniques to acquire and manage ambient noise data.
- (U) ($1,100) Continued development of next-generation sensors for MEASURE, Moriah and aerosol measurements.
- (U) ($984) Continued development of data connectivity with the next generation Tomahawk mission planning system and GCCS/M. Began development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0)
- (U) ($775) Completed instrumentation demonstration and validation of joint RMS vehicle for remote littoral bathymetry/mine hunting.
- (U) ($850) Continued information management and DMAP functions.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

2. (U) FY 2001 PLAN:

- (U) ($1,275) Complete sensor developments for ROV/AUV, and continue sensor integration and development of UAV sensors in Tier II Plus Vehicles.
- (U) ($1,175) Continue assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
- (U) ($1,305) Continue development of advanced techniques to acquire and manage ambient noise data.
- (U) ($1,180) Complete development of next-generation sensors for MEASURE, MORIAH and aerosol measurements.
- (U) ($1,170) Complete development of data connectivity with the next generation Tomahawk mission planning system. Continue development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0) and GCCS/M.
- (U) ($1,621) Begin development of next-generation acoustic data acquisition techniques
- (U) ($950) Continue information management and DMAP functions.

3. (U) FY 2002 PLAN:

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

- (U) ($1,075) Complete sensor integration and development of UAV sensors in Tier II Plus Vehicles. Begin development of sensor suite for Tier III Vehicles.
- (U) ($1,425) Continue assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
- (U) ($1,265) Continue development of advanced techniques to acquire and manage ambient noise data.
- (U) ($1,068) Begin development of autonomous clandestine sensors for measurements in denied areas.
- (U) ($1,280) Complete development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0) and GCCS/M. Begin development of data connectivity with Joint C4ISR.
- (U) ($2,047) Continue development of next-generation acoustic data acquisition techniques
- (U) ($1,020) Continue information management and DMAP functions.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2341
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Acquisition

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 2000 adjustments are due to Across the Board Reduction (-48), Miscellaneous Navy adjustments (-338), SBIR Assessments (-183) and Section 8055 Congressional Proportionate Rescission (-34).

(U) Funding: FY2001 adjustments are due to Section 8086 .7% Pro-rata Reduction (-61) and a Government recission of (-19).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY:

(U) RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP onboard selected ships and shore sites.

(U) ACQUISITION STRATEGY: Not applicable

Exhibit R-3 Project Cost Analysis (page 1)										Date: May 01		
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5			PROGRAM ELEMENT: 0603207N							PROJECT NAME AND NUMBER: X2341 METOC DATA ACQUISITION		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WX	NRL	6,429	3,992	N/A	4,325	N/A		N/A	CONT	CONT	
	WX	NAWC-AD Lake	778	0	N/A	0	N/A		N/A	CONT	CONT	
	CP	ARL/APL	3,000	1,100	N/A	1,122	N/A		N/A	CONT	CONT	
	WX	NSWC	0	850	N/A	867	N/A		N/A	CONT	CONT	
	N/A	MISC	4,058	2,184	N/A	2,305	N/A		N/A	CONT	CONT	
Subtotal Product Development			14,265	8,126	NA	8,619	NA		N/A	CONT	CONT	
Remarks:												
Support	CP	SSA	1,065	550	N/A	561	N/A		N/A	CONT	CONT	
Subtotal Support			1,065	550	N/A	561	N/A		N/A	CONT	CONT	

Remarks

Exhibit R-3 Project Cost Analysis (page 2)									Date: May 01				
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5			PROGRAM ELEMENT: 0603207N						PROJECT NAME AND NUMBER: X2341 METOC DATA ACQUISITION				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Subtotal T&E													
Remarks													
Subtotal Management													
Remark													
Total Cost			15,330	8,676	N/A	9,180	N/A	10,387	N/A	CONT	CONT		
Remarks													

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2342
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Assimilation and Modeling

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X2342 METOC Data Assimilation and Modeling.										
	11,711	14,659	13,591						CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The meteorological and oceanographic (METOC) Data Assimilation Project is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers. Included are numerical oceanographic and atmospheric models for the Large Scale Computers at the Navy Fleet Numerical Meteorology and Oceanography Center, Monterey, CA and the Naval Oceanographic Office, Stennis Space Center, MS. These models, combined with a global communications network for data acquisition and distribution, form a prediction system which provides METOC data and products necessary to support naval operations worldwide in virtually every mission area; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder. These techniques allow for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite-borne sensors. Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. As weapons and sensors become more sophisticated and complex, the marine environment has an increasingly significant impact on system performance. Operational limitations induced by the ocean and atmosphere must be understood, and the resulting constraints on mission effectiveness and system employment minimized. Hence, the operating

forces require more accurate worldwide forecasts of METOC conditions with increased temporal and spatial resolution. An additional challenge is posed by the emergence of new satellite sensors, which are continually adding new sources of disparate data types. In order to fully exploit this dynamic and massive volume of data, modern data base management systems (DBMS) are required, and must be tailored for individual computer configurations. Improved representation of smaller-scale phenomena, particularly in the littoral, is also an important consideration.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1.(U) FY 2000 ACCOMPLISHMENTS:

- (U) ($1,047) Continued modeling and simulation of atmosphere and ocean environmental effects on Navy systems.
- (U) ($1,002) Continued developments of techniques for coupled air/ocean data assimilation.
- (U) ($400) Participated in selected fleet exercises and demonstrations.
- (U) ($925) Completed development of MPP version of NOGAPS and the shipboard version of tactical scale nested model for operational use.
- (U) ($1,385) Began development of next generation high resolution coupled air/ocean forecast models.
- (U) ($1,412) Completed development of next-generation tropical cyclone forecast model and the Arabian Gulf/Arabian ocean model. Continued development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
- (U) ($1,165) Continued development of capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using 4D variational techniques.

- (U) ($1,250) Continued development of techniques for bathymetry and surf zone and high resolution micro-topography algorithms and automated objective processing in the littoral.

- (U) ($1,285) Continued development of shipboard shallow water ocean circulation model, next generation tide and surf models, and automated graphical applications for tactical data visualization.

- (U) ($1,025) Continued the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.

- (U) ($815) Continued the verification and validation of products and data assimilation techniques developed for fleet applications.

2. (U) FY 2001 PLAN:

- (U) ($1,256) Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems.

- (U) ($1,355) Complete developments of techniques for coupled air/ocean data assimilation. Begin development of variational techniques for coupled assimilation.

- (U) ($579) Participate in selected fleet exercises and demonstrations.

- (U) ($1,253) Continue development of next generation high resolution coupled air/ocean forecast models.

- (U) ($1,250) Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.

- (U) ($1,165) Complete development of capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using 4D variational techniques.

- (U) ($1,150) Continue development of techniques for bathymetry and surf zone and high resolution micro-topography algorithms and automated objective processing in the littoral.

- (U) ($1,185) Continue development of shipboard shallow water ocean circulation model, next generation tide and surf models, and automated graphical applications for tactical data visualization.

- (U) ($1,026) Begin development of next-generation active and passive acoustic models.

- (U) ($1,025) Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.

- (U) ($915) Continue the verification and validation of products and data assimilation techniques developed for fleet applications.
- (U) ($2,500) This is a one-year effort to develop improved hydrographic data collection, data processing, and production techniques based on a Congressional add to establish the National Center of Excellence in Hydrography at the University of Southern Mississippi. There is no outyear funding identified to continue this effort.

3. (U) FY 2002 PLAN:

- (U) ($1,312) Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems.

- (U) ($1,275) Continue development of variational techniques for coupled assimilation.

- (U) ($635) Participate in selected fleet exercises and demonstrations.

- (U) ($1,810) Continue development of next generation high resolution coupled air/ocean forecast models.

- (U) ($1,504) Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2342
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Assimilation and Modeling

- (U) ($1,105) Begin development of new capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using Artificial Intelligence techniques.
- (U) ($1,500) Continue development of techniques for bathymetry and surf zone and high resolution micro-topography algorithms and automated objective processing in the littoral.
- (U) ($1,225) Complete development of shipboard shallow water ocean circulation model, next generation tide and surf models, and automated graphical applications for tactical data visualization.
- (U) ($1,185) Continue development of next-generation active and passive acoustic models.
- (U) ($1,035) Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
- (U) ($1,005) Continue the verification and validation of products and data assimilation techniques developed for fleet applications.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2342
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: METOC Data Assimilation and Modeling

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 2000 adjustments are due to Across the Board Adjustments (-68), SBIR Assessments (-98), Section 8055 Congressional Proportionate Rescission (-48) and Miscellaneous Navy Adjustments (-364).

(U) Funding: FY 2001 adjustments are due to Section 8086 .7% Pro-rata Reduction (-104),Section 66744 National Center of Excellence in Hydrography Congressional Add (2,500), and Government wide recission (-32).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

D. (U) ACQUISITION STRATEGY: Not applicable.

Exhibit R-3 Project Cost Analysis (page 1)									Date: May 01			
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/5A5		PROGRAM ELEMENT:0603207N							PROJECT NAME AND NUMBER: X2342 METOC DATA ASSIMILATION AND MODELING			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WX	NRL	16,101	8,714	N/A	9,319	N/A		N/A	CONT	CONT	
	WX	NAWC-WD, PM	790	410	N/A	418	N/A		N/A	CONT	CONT	
	N/A	MISC	5,593	2,880	N/A	3,696	N/A		N/A	CONT	CONT	
		NAVOCEANO		2,500								
Subtotal Product Development			22,848	14,504	N/A	13,433	N/A		N/A	CONT	CONT	
Remarks:												
Support	CP	SSA	295	155	N/A	158	N/A		N/A	CONT	CONT	
Subtotal Support			295	155	N/A	158	N/A		N/A	CONT	CONT	

Remarks

Exhibit R-3 Project Cost Analysis (page 2)								Date: May 01				
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/5A5		PROGRAM ELEMENT:0603207N						PROJECT NAME AND NUMBER: X2342 METOC DATA ASSIMILATION AND MODELING				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost			22,779	14,659	N/A	13,591	N/A	13,140	N/A	CONT	CONT	
Remarks												

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2343
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical METOC Applications

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X2343 Tactical METOC Applications										
	7,280	7,755	8,056						CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The METOC Data Applications project is a continuing effort to develop and field state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments. These assessments allow mission planners and warfighters, from the unit to theater level, to tactically optimize sensor employment on airborne, surface, and subsurface platforms in support of all Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), and Special Warfare. Emphasis is placed on products to support littoral and regional conflict scenarios. Performance assessments leading to improvements in tactical control are conducted through a two-tiered approach: 1) METOC Decision Aids (MDAs); and, 2) Tactical Decision Aids (TDAs). MDAs consist of a series of analysis tools which characterize the electromagnetic (EM), electro-optical (EO), atmospheric, oceanographic, and acoustical properties of the battlespace based on the best environmental scene description available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ data. TDAs, also developed under this project, then use this information to predict how various weapons and sensor systems will perform given the current METOC conditions, and present these predictions in various tabular and graphic formats used by mission planners and combat/weapon system operators to develop ASW and MIW search and localization plans, USW/AAW/ASUW screens, STW profiles, AMW ingress and egress points, and other considerations. Project X2343 MDAs and TDAs use data obtained by sensors developed in Project X2341 (METOC Data Acquisition) and assimilated by software produced by Project X2342 (METOC Data Assimilation and Modeling), also contained in this Program Element. They also used data obtained through direct interfaces to the combat systems. A current emphasis area of the project is the development of new combat system and mine warfare performance prediction and MDA/TDA capabilities required to characterize and/or predict sensor and weapons

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2343
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical METOC Applications

system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly Mine Warfare, shallow water ASW, and missile and air defense/strike capabilities.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2343
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical METOC Applications

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($915) Continued development of AREPS and began development of next generation Electro-optical decision aids.
- (U) ($2,527) Continued to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Continued to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.
- (U) ($1,448) Continued to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADMs. Performed at-sea evaluation of new capabilities.
- (U) ($1,240) Continued to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADMs to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluated functionality during at-sea tests.
- (U) ($1,150) Continued to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy’s Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implemented in the platform ADMs and evaluated at-sea.

2. (U) FY 2001 PLAN:

- (U) ($1,025) Complete development of AREPS. Continue development of next generation Electro-optical decision aids. Begin development of an advanced electromagnetic propagation model incorporating artificial intelligence techniques.

- (U) ($2,652)Continue to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Continue to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.

- (U) ($1,668) Continue to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADMs. Perform at-sea evaluation of new capabilities.

- (U) ($1,135) Continue to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADMs to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.

- (U) ($1,275) Continue to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADMs and evaluate at-sea.

3. (U) FY 2002 PLAN:

- (U) ($975) Complete development of next generation Electro-optical decision aids. Continue development of an advanced electromagnetic propagation model incorporating artificial intelligence techniques.

- (U) ($3,051) Continue to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Continue to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.

- (U) ($1,775) Continue to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADMs. Perform at-sea evaluation of new capabilities.

EXHIBIT R-2a, FY 2002 RDT&E,N PROJECT JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2343
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical METOC Applications

- (U) ($1,115) Continue to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADMs to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.

- (U) ($1,140) Continue to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADMs and evaluate at-sea.

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 2000 adjustments are due to Across the Board reductions (-43), SBIR Assessment (-127), Section 8055 Congressional Proportionate Rescission (-30), and Miscellaneous Navy Adjustments (-227).

(U) Funding: FY 2001 adjustments are due to Section 8086 .7% Pro-rata Reduction (-55); Government Wide Recission (-17K).

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). TESS/NITES will incorporate METOC data applications.

D. (U) ACQUISITION STRATEGY: Not applicable.

Exhibit R-3 Project Cost Analysis (page 1)												Date: May 01
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5			PROGRAM ELEMENT:0603207N					PROJECT NAME AND NUMBER: X2343 TACTICAL METOC APPLICATIONS				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WX	NUWC	1,400	740	N/A	755	N/A		N/A	CONT	CONT	
	WX	SSC SD	720	365	N/A	372	N/A		N/A	CONT	CONT	
	WX	NRL	600	305	N/A	311	N/A		N/A	CONT	CONT	
	CP	IPD	6,486	4,028	N/A	4,298	N/A		N/A	CONT	CONT	
	CP	LOCKHEED	1,053	400	N/A	571	N/A		N/A	CONT	CONT	
	N/A	MISC	3,389	1,612	N/A	1,438	N/A		N/A	CONT	CONT	
Subtotal Product Development			13,648	7,450	N/A	7,745	N/A		N/A	CONT	CONT	
Remarks:												
Support	CP	IPD	595	305	N/A	311	N/A		N/A	CONT	CONT	
Subtotal Support			595	305	N/A	311	N/A		N/A	CONT	CONT	

Remarks

Exhibit R-3 Project Cost Analysis (page 2)												Date: May 01
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5			PROGRAM ELEMENT:0603207N									PROJECT NAME AND NUMBER: X2343 TACTICAL METOC APPLICATIONS
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost			14,243	7,755	N/A	8,056	N/A	8,555	N/A	CONT	CONT	

Remarks

EXHIBIT R-2a, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2344
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing and Astrometry

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X2344 Precise Timing and Astrometry										
	1,384	1,446	1,505						CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The major thrusts of the Precise Timing and Astrometry Project in direct support of the U.S. Naval Observatory (USNO) are to: 1) address DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions (including objects at other than optical wavelengths) and the stellar inertial reference system (to which all navigation, guidance, and positioning systems are ultimately referred); 2) develop techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) oversee the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) develop advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies. DoD Instruction 5000.2 assigns to the Navy the responsibility for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD Services, Federal agencies, and related scientific laboratories. The Navy is also responsible for providing astronomical data for navigation, positioning, and guidance, including space. Some operational and many emerging requirements surpass current support capabilities. In response to these DoD requirements, this project transitions Research (6.1) and Exploratory Development (6.2) efforts, as well as developments in the civilian sector, into the operational capabilities and products of the USNO.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($494) Continued evaluation of GPS time transfer capability.
- (U) ($494) Continued evaluation of cesium fountain clock and VLBI/GPS demonstration for earth orientation parameters.
- (U) ($396) Continued InSb (Indium-Antimony) detector survey.

2. (U) FY 2001 PLAN:

- (U) ($425) Complete evaluation of GPS time transfer capability. Begin development of next-generation time transfer capabilities.
- (U) ($285) Complete evaluation of cesium fountain clock and continue VLBI/GPS demonstration for earth orientation parameters.
- (U) ($403) Complete InSb (Indium-Antimony) detector survey.
- (U) ($333) Begin exploitation of emergent Master Clock technologies.

3. (U) FY 2002 PLAN:

- (U) ($375) Continue development of next-generation time transfer capabilities.
- (U) ($425) Continue VLBI/GPS demonstration for earth orientation parameters.
- (U) ($705) Continue exploitation of emergent Master Clock technologies.

EXHIBIT R-2a, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION Date: May 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2344
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing and Astrometry

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 2000 adjustments are due to Across the Board adjustments (-8), SBIR Assessments (-3), and Section 8055 Congressional Proportionate Rescission (-6), and Miscellaneous Navy Adjustments (-43).

(U) Funding: FY 2001 adjustments are due to Section 8086 .7% Pro-rata Reduction (-10), Government Wide Recission (-3).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: None

D. (U) ACQUISITION STRATEGY: Not applicable.

Exhibit R-3 Project Cost Analysis (page 1)												Date: May 01
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5			PROGRAM ELEMENT: 0603207N									PROJECT NAME AND NUMBER: X2344 PRECISE TIMING AND ASTROMETRY
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WX	NAVAL OBSERVATORY	2,788	1,446	N/A	1,505	N/A		N/A	CONT	CONT	
Subtotal Product Development			2,788	1,446	N/A	1,505	N/A		N/A	CONT	CONT	
Remarks:												
Subtotal Support												

Remarks

Exhibit R-3 Project Cost Analysis (page 2)								Date: May 01				
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BA5		PROGRAM ELEMENT: 0603207N						PROJECT NAME AND NUMBER: X2344 PRECISE TIMING AND ASTROMETRY				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY00+ PY Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost			2,788	1,446	N/A	1,505	N/A	1,533	N/A	CONT	CONT	
Remarks												

R-1 Shopping List - Item No 43(36) of 43 (27)

Exhibit R-3, Project Cost Analysi

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification										DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**						R-1 ITEM NOMENCLATURE 0603216N Aviation Survivability					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Total PE Cost		**13.622**	**7.458**	**7.538**						**Continuing**	**Continuing**
W0584 Aircrew Protective Clothing and Devices		*** 9.417**	**2.842**	**2.875**						**Continuing**	**Continuing**
W0591 Aircraft Survivability, Vulnerabilty and Safety		**1.584**	**1.884**	**1.893**						**Continuing**	**Continuing**
W0592 A/C & Ordnance Safety		**1.668**	**1.750**	**1.744**						**Continuing**	**Continuing**
W1819 Carrier Vehicle Aircraft Fire Suppression System		**0.953**	**0.982**	**1.026**						**Continuing**	**Continuing**
Quantity of RDT&E Articles **Not applicable**											

* The FY00 budget reflects:
$3.000M Congressional add for Escape System Dynamic Flow executed under project W2604, which was revised by $.062 for Congressional undistributed reductions,
$2.000M Congressional add for Smart Aircrew Integrated Life Support System (SAILSS) executed under project W2605, which was revised by $.054 for Congressional undistributed reductions,
$1.000M Congressional add for Lightweight Environmentally Sealed Parachute Assembly (LESPA) executed under project W2727, which was revised by $.024 for Congressional undistributed reductions , and $1.000M Congressional add for Pilot Vehicle Interface Upgrade executed under project W2728 which was revised by $.025 for Congressional undistributed reductions .

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.

(U) Aircrew Protective Clothing and Devices develops, demonstrates, and validates technology options that enhance aircrew capability to perform assigned missions. In addition, this project ensures aircrew protection against natural and induced environmental or physiological hazards encountered during routine, combat and emergency flight operations as well as during escape, survival and rescue, following loss of aircraft.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**	R-1 ITEM NOMENCLATURE 0603216N Aviation Survivability

(U) The three remaining projects focus on platform survivability, addressing the reductions in aircraft susceptibility to enemy and non-combat threats, as well as aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological and directed energy weapons. The Aircraft Survivability, Vulnerability and Safety project expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. Aircraft and Ordnance Safety transitions generic insensitive munitions technology to Navy and Marine Corps air weapons, ensuring that they are insensitive to fast cook-off, slow cook-off, and fragment impact and sympathetic detonation. Carrier Aircraft Fire Suppression Systems develops improved fire fighting systems and fire protective measures for aircraft carriers.

(U) JUSTIFICATION FOR BUDGET ACTIVITY:

This program is funded under DEMONSTRATION and VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603216N Aviation Survivability					PROJECT NUMBER AND NAME W0584 Aircrew Protective Clothing and Devices					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		*** 9.417**	**2.842**	**2.875**						**Continuing**	**Continuing**
RDT&E Articles Qty											

* The FY00 budget reflects :
$3.000M Congressional add for Escape System Dynamic Flow executed under project W2604, which was revised by $.062 for Congressional undistributed reductions,
$2.000M Congressional add for Smart Aircrew Integrated Life Support System (SAILSS) executed under project W2605, which was revised by $.054 for Congressional undistributed reductions,
$1.000M Congressional add for Lightweight Environmentally Sealed Parachute Assembly (LESPA) executed under project W2727, which was revised by $.024 for Congressional undistributed reductions , and $1.000M Congressional add for Pilot Vehicle Interface Upgrade executed under project W2728 which was revised by $.025 for Congressional undistributed reductions .

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project W0584 develops, demonstrates, and validates technology options for integrated aircrew emergency and life support systems designed to enhance mission effectiveness, in-flight protection and survivability. The project covers fixed and rotary wing life support equipment, advanced helmet vision systems, escape systems technology, crew centered cockpit design, and cockpit integration programs. It responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological (CB) Protection, OR#099-05-087 for Laser Eye Protection, and the joint Air Force/Navy (CAF 208-93) for an Aerospace Control Helmet Mounted Cueing System. In 1996, the various sub-projects were restructured into a combined Advanced Technology Crew Station (ATCS) and Advanced Integrated Life Support System (AILSS) program. This project is validated by two Non-Acquisition Development Documents (NAPDDS)-- one for an Advanced Technolgoy Crew Station (ATCS), and the other for AILSS.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) ($.894) Continued Advance Technology Escape System (ATES) using controllable propulsion (Fourth Generation Escape System). Began component integration.

- (U) ($.300) Advanced Helmet Vision System (AHVS) completed head/neck weight moments of inertia studies.

- (U) ($.300) Continued enhanced resolution development for Crusader day/night all weather helmet mounted display system.

- (U) ($.500) Continued SAILSS.

- (U) ($.500) Continued development of non-linear materials for frequency agile laser eye protection.

-(U) ($.088) Extended Visualization Architecture Technology (VAT) to single user virtual image display.

-(U) ($2.938) Continued the development of the laminar flow ejection tower test facility.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W0584 Aircrew Protective Clothing and Devices

1. FY 2000 ACCOMPLISHMENTS (continued)
   - (U) ($1.946) Continued SAILSS with emphasis on miniaturization of sensors and electronics.

   . (U) ($.976) Began the development of the lightweight environmentally sealed parachute.

   . (U) ($.975) Began the development of the pilot vehicle interface upgrade.

2. FY 2001 PLANS:
   -(U) ($.842) Continue ATES using controllable propulsion (Fourth Generation Escape System). Continue component integration.

   -(U) ($.931) Complete enhanced resolution Crusader day/night all weather helmet mounted display system.

   -(U) ($.477) Continue SAILSS.

   -(U) ($.500) Complete technology demonstration for non-linear materials phase of frequency agile laser eye protection development.

   -(U) ($.080) Complete VAT, validate single user displays.

   -(U) ($.012) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 68.

3. FY 2002 PLANS:

   -(U) ($.600) Exercise option to begin development of frequency Agile flight worthy unity magnification goggles (laser eye protection).

   -(U) ($.284) Begin system integration and flight testing of Advanced Helmet Vision System enhanced resolution Crusader. Conduct I2/Thermal mode control studies.

   -(U) ($.470) Integrate SAILSS with on-board oxygen and personal air conditioning systems.

   -(U) ($.380) Integrate Pilot Vehicle Interface on-board/off-board data correlation on test aircraft and begin flight testing.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W0584 Aircrew Protective Clothing and Devices

2. FY 2002 PLANS (continued)

-(U) ($.563) Integrate ATES ejection seat trajectory and crashworthy seat stroking models with biodynamic models. Incorporate computational fluid dynamics and parachute models.

-(U) ($.300) Conduct preliminary ergonomic seating design, validate BioRID performance, and mature final version.

-(U) ($.278) Begin crewstation technology laboratory demonstration of Active Network Guidance Emergency Logic (ANGEL).

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W0584 Aircrew Protective Clothing and Devices

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	9.641	2.872	2.932
(U) Adjustments from the President's Budget:	-0.224	-0.030	-0.057
(U) FY 2002/2003 OSD/OMB Budget Submit:	9.417	2.842	2.875

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 net decrease of $.224 million consists of a $.124 million decrease for the Small Business Innovative Research assessment; a $.062 million decrease for reprioritization of requirements within the Navy; and a $.038 million decrease for a Congressional Recission. The FY 2001 net decrease of $.030 million consists of a $.004 million decrease for reprioritization of requirements within the Navy, a $.020 million decrease for a Congressional reduction, and a $.006 million decrease for a Congressional recission. The FY 2002 net decrease of $.057 million consists of a $.013 million decrease for reprioritization of requirements within the Navy, and $.044 million decrease for economic assumptions

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Related RDT&E
(U) PE 0602201F (Aerospace Flight Dynamics)
(U) PE 0602233N (Mission Support Equipment)
(U) PE 0604264N (Aircrew Systems Development)
(U) PE 0604706F (Life Support Systems)
(U) PE 06023231F (Crew Systems and Personal Protection Technology)

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, NBA-4	0603216N Aviation Survivability	W0584 Aircrew Protective Clothing and Devices	

(U) D. ACQUISITION STRATEGY: Not applicable

(U) E. SCHEDULE PROFILE:

	FY 2000	FY 2001	FY 2002	TO COMPLETE
(U) Program Milestones				
4th Generation Escape (ATES) & controllable propulsion	Begin component integration (1Q 00)	Begin component integration	Complete integration 1Q 02	
Crusader Day/Night All Weather Display System	Continue	Complete 4Q 01		
Crusader High Resolution Upgrade			Initiate 1Q 02	Continue
VAT Networking		Complete 4Q01		
VAT (Single User)	Initiate 1Q 00	Complete 4Q01		
Frequency Agile Laser Eye Protection (non-linear materials)	Continue	Complete Tech Demo (4Q 01)	Begin prototype develop. (1Q 02)	Continue
SAILSS	Continue	Continue	Continue	Continue
(U) Engineering Milestones				
Laminar Flow Facility	Initiate HIVAS upgrades 3Q 00	Complete 2Q 01		
LESPA	Initiate thin pack modifications	Complete 2Q 01		
(U) T&E Milestones				
Crusader day/night system DT-1	Complete			
Crusader day/night high resolution system DT-1			Initiate 1Q 02	Continue
LESPA	Initiate 3Q 00	Complete 2Q 01		
ANGEL			Initiate Demonstrations 1Q 02	Continue
(U) Contract Milestones	Not applicable			

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603216N Aviation Survivability				PROJECT NUMBER AND NAME W0584 Aircrew Protective Clothing and Devices						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Miscellaneous	WX	NAWC AD Pax River	16.641	1.376	Various	1.368	Various			Continuing	Continuing	
Miscellaneous	Various	Various	10.765								10.765	10.765
McDonnell Douglas		McDonnell Douglas, St. Louis	1.325								1.325	1.325
Boeing		Boeing, Seattle, Wa	1.660								1.660	1.660
Subtotal Product Development			30.391	1.376		1.368				Continuing	Continuing	
Remarks:												
Miscellaneous	Various	Various	1.019	0.467	Various	0.500	Various			Continuing	Continuing	
SBIR Assessment				0.012							0.012	
Subtotal Support			1.019	0.479		0.500				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603216N Aviation Survivability			PROJECT NUMBER AND NAME W0584 Aircrew Protective Clothing and Devices						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	Various	13.873	0.977	Various	0.996	Various			Continuing	Continuing	
Subtotal T&E			13.873	0.977		0.996				Continuing	Continuing	
Remarks:												
Travel	WX	NAWC AD Patuxent River	0.085	0.010	10/00	0.011	10/01			Continuing	Continuing	
Subtotal Management			0.085	0.010		0.011				Continuing	Continuing	
Remarks:												
Total Cost			45.368	2.842		2.875				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603216N Aviation Survivability					PROJECT NUMBER AND NAME W0591 Aircraft Survivability and Vulnerability					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**1.584**	**1.884**	**1.893**						**Continuing**	**Continuing**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Aircraft Survivability, Vulnerability and Safety. This project develops prototype hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) ($1.349) Continued the development of a rotary wing IR survivability signature suppression program (initiate flight test).
- (U) ($.100) Initiated uninhabited aerial vehicle (UAV) survivability program; focus on trade study/cost analysis.
- (U) ($.020) Completed annual update of Aircraft Survivability Database.
- (U) ($.115) Continued development of Survivability Analysis Methodology (based on FY99 roadmap).

2. FY 2001 PLANS:

- (U) ($1.424) Complete the development of a rotary wing IR survivability signature suppression system.
- (U) ($.020) Prepare biannual update of RDT&E master plan.
- (U) ($.020) Prepare annual update of Aircraft Survivability Database.
- (U) ($.165) Continue development of Survivability Analysis Methodology (based on FY99 roadmap).

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216 Aviation Survivability	W0591 Aircraft Survivability, Vulnerability, and Safety

2. FY 2001 PLANS (continued)

-(U) ($.227) Continue UAV survivability trade study (define hardware technology candidate).

-(U) ($.028) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 68.

3. FY 2002 PLANS:

- (U) ($1.393) Continue UAV Survivability Enhancement (design and fabrication of selected technology candidates).

- (U) ($.200) Initiate Transport/Reconnaissance Survivability program; focus on trade study/cost analysis.

- (U) ($.200) Initiate Aircraft Advanced Fire Protection Technology trade study.

- (U) ($.100) Initiate Advanced Threats study (Start radio frequency (RF) weapons).

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216 Aviation Survivability	W0591 Aircraft Survivability, Vulnerability, and Safety

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	1.868	1.904	1.912
(U) Adjustments from the President's Budget:	-0.284	-0.020	-0.019
(U) FY 2002 President's Budget Submit:	1.584	1.884	1.893

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 net decrease of $.284 million consists of a $.035 million decrease for Small Business Innovative Research assessment, a $.242 million decrease for reprioritization of requirements within the Navy, and a $.007 million decrase for a Congressional recission. The FY 2001 net decrease of $.020 million consists of a $.003 million decrease for reprioritization of requirements within the Navy, a $.013 million decrease for a Congressional reduction, and a $.004 million decrease for a Congressional recission. The FY 2002 net decrease of $.019 million consists of a $.007 million decrease for reprioritization of requirements within the Navy, and a $.012 million decrease for economic assumptions.

(U) Schedule: IR suppressor flight test changed from 2Q01 to 4Q01 because test asset will not be available until after 2Q01. Rescheduling of test will also allow for summer test conditions (high temperature/high humidity).

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Related RDT&E:

(U) PE 0605132D (Joint Technical Coordinating Group on Aircraft Survivability)

(U) PE 0603384D (Chemical/Biological Defense (Advanced Development)

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, N BA-4	06031216N Aviation Survivability	W0591 Aviation Survivabilty, Vulnerability and Safety	

(U) D. ACQUISITION STRATEGY: Not applicable

(U) E. SCHEDULE PROFILE:

	FY 2000	FY 2001	FY 2002	TO COMPLETE
(U) Program Milestones				
UAV survivability trade study	Initiate 1Q00	Complete 3Q01		
Bi-annual Master Plan updates		Complete 4Q01		Continue
Transport/Reconnaissance Survivability Trade Study			Initiate 2Q02	Continue
Advanced Threats Trade Study (RF weapons)			Initaite 1Q02	Continue
Advanced A/C Fire Protection Trade Study			Initaite 2Q02/Comp 4Q02	
(U) Engineering Milestones				
Not applicable				
(U) T&E Milestones				
IR Suppressor flight test	Initiate 4Q00	Complete 4Q01		
UAV flight test			Initiate 4Q02	Continue
Advanced Aircraft Fire Protection Demonstration				Continue
(U) Contract Milestones				
Not applicable				

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603216N Aviation Survivability				PROJECT NUMBER AND NAME W0591 Aircraft Survivability, Vulnerability, and Safety						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPFF	Sikorsky, Connecticut	2.454	0.659	10/00						3.113	3.113
Primary Hardware Development	TBD	Contractor TBD				0.885	03/02			0.717	1.602	1.602
Primary Hardware Development	WX	Various- Govt activities				0.050	10/01			0.150	0.200	
Systems Engineering	WX	Various	5.754	0.524	10/00	0.913	11/01			Continuing	Continuing	
Primary Hardware Development	SS/CFFF	Bell Helicopter	1.307								1.307	1.307
Subtotal Product Development			9.515	1.183		1.848				Continuing	Continuing	
Remarks:												
Technical Data	WX	Various	0.143	0.111						Continuing	Continuing	
Subtotal Support			0.143	0.111		0.000				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)						DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603216N Aviation Survivability			PROJECT NUMBER AND NAME W0591 Aircraft Survivability, Vulnerability and Safety						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX	Various	1.018	0.055	10/00					Continuing	Continuing	
SBIR Assessment				0.028							0.028	
Subtotal T&E			1.018	0.083		0.000				Continuing	Continuing	
Remarks:												
Program Management Support	WX	Various				0.035	10/01			Continuing	Continuing	
Travel	WX	Various	0.185	0.010	10/00	0.010	10/01			Continuing	Continuing	
Subtotal Management			0.185	0.010		0.045				Continuing	Continuing	
Remarks:												
Total Cost			10.861	1.387		1.893				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification										DATE: June 2001	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603216N Aviation Survivability					PROJECT NUMBER AND NAME W0592 A/C & Ordnance Safety					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**1.668**	**1.750**	**1.744**						**Continuing**	**Continuing**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project transitions Insensitive Munitions (IM) technology from IM Advanced Development (generic technology) to Air Weapon Systems to comply with Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and fragment impact (BI and FI), and sympathetic detonation (SD).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) ($.338) Demonstrated manufacturability of 2.75-inch rocket motor. Evaluated reactive material warheads for IM compliance.
- (U) ($.417) Continued evaluation of IM technology to pumice as a sympathetic detonation barrier and validated tandem warhead containment models.
- (U) ($.913) Fabricated Sidewinder composite rocket motor cases. Performed ground and flight testing of Sidewinder composite rocket motor.

2. FY 2001 PLANS:

- (U) ($.849) Continue evaluating reactive material warheads for IM compliance.
- (U) ($.401) Demonstrate pumice as a sympathetic detonation barrier for weapon shipping containers.
- (U) ($.500) Complete flight testing and document flight certification process for Sidewinder composite case.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W0592 A/C & Ordnance Safety

3. FY 2002 PLANS:

- (U) ($.479) Continue evaluating reactive material warheads for IM compliance. Conduct IM and performance testing on sub-scale manufactured 2.75-inch motors.
- (U) ($.565) Demonstrate pumice as a sympathetic detonation barrier for weapon shipping containers. Refine pumice design capability for SD mitigation.
- (U) ($.700) Continue ground and flight testing Sidewinder composite rocket motor. Conduct air to air missile IM warhead testing.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W0592 A/C & Ordnance Safety

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	1.715	1.768	1.784
(U) Adjustments from the President's Budget:	-0.047	-0.018	-0.040
(U) FY 2002/2003 OSD/OMB Budget Submit:	1.668	1.750	1.744

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 net decrease of $.047 million consists of a $.040 million decrease for reprioritization of requirements within the Navy and a $.007 million decrease for a Congressional recission. The FY 2001 net decrease of $.018 million consists of a $.002 million decrease for reprioritization of requirements within the Navy, a $.012 million decrease for a Congressional reduction, and a $.004 million decrease for Congressional recission. The FY 2002 net decrease of $.040 million consists of a $.008 million decrease for reprioritization of requirements within the Navy and a $.032 million decrease for economic assumptions.

(U) Schedule: Not applicable

(U) Technical: Not applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

Related RDT&E:

PE 0604802A
PE 0603609N

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: Not applicable

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603216N Aviation Survivability				PROJECT NUMBER AND NAME W0592 A/C & Ordnance Safety						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	WX	NAWCWD China Lake	12.585	1.720	10/00	1.714	10/01			Continuing	Continuing	
Subtotal Product Development			12.585	1.720		1.714				Continuing	Continuing	
Remarks:												
Subtotal Support			0.000	0.000		0.000				0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603216N Aviation Survivability			PROJECT NUMBER AND NAME W0592 A/C & Ordnance Safety						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Travel	WX	NAWCAD Pax River	0.060	0.030	10/00	0.030	10/01			Continuing	Continuing	
Subtotal Management			0.060	0.030		0.030		0.000		Continuing	Continuing	
Remarks:												
Total Cost			12.645	1.750		1.744		0.000		Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603216N Aviation Survivability					PROJECT NUMBER AND NAME W1819 Carrier Vehicle Aircraft Fire Suppression System					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**0.953**	**0.982**	**1.026**						**Continuing**	**Continuing**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops improved fire fighting systems and fire protective measures for aircraft related fires on aircraft carriers, including assessment of fire properties, definition of fire threats, improvements to fire fighting agents and delivery systems, fire detection and suppression system performance evaluations, and fire fighter training improvements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) ($.518) Conducted testing of fire test standards for wheel/brake, electrical, and spill fires. Identified critical test parameters and provided adequate instrumentation for testing. Manufactured details for fire threat simulators with adequate test repeatability provisions. Conducted full scale, fleet representative fire testing to evaluate relative performance of available and developmental extinguishing systems.

- (U) ($.155) Enhanced the Mobile Aircraft Fire Fighting Training Device by evaluating options to propane fuel. Conducted live fire training demonstrations. Incorporated system upgrades based on fleet responses. Established zoning criteria to maximize fleet personnel training opportunities.

- (U) ($.280) Continued carrier reduced manning studies. Evaluated potential negative safety impact of reduced manning of Navy ships relative to current level of onboard fire fighting provisions. Ensured adequate fire fighting provisions are maintained through evaluation of systems hardware enhancements, development of novel fire fighting approaches, and optimized personnel emergency procedures. Assessed opportunities for overall improvement in shipboard handling of fire emergencies.

2. FY 2001 PLANS

- (U) ($.440) Complete testing and finalize fire test standards for wheel/brake, electrical, and spill fires. Complete identification of critical test parameters and provision of adequate instrumentation for testing. Compile pros and cons of each system for review.

- (U) ($.225) Continue carrier reduced manning studies. Evaluate potential negative safety impact of reduced manning of Navy ships relative to current levels of onboard fire fighting provisions. Ensure adequate fire fighting provisions are maintained through evaluation of systems hardware enhancements, development of novel fire fighting approaches, and optimized personnel emergency procedures. Assess opportunities for overall improvement in shipboard handling of fire emergencies.

- (U) ($.134) Initiate studies of fire threat from alternate fuel. Evaluate the different characteristics of JP-8 versus JP-5 fires. Identify deficiencies and promote opportunities for improvement.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W1819 Carrier Vehicle Aircraft Fire Suppression System

2. FY 2001 PLANS (continued)

(U) (.$174) Evaluate next generation fire threats aboard carriers. Assess enhanced fire threats associated with more reliance on high powered electrical and electromagnetic components aboard ship. Evaluate remote fire detection and fire suppression methodologies and test prototypical hardware for performance.

(U) (.$009) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 68.

3. FY 2002 PLANS

(U) ($.207) Evaluate alternatives to Aqueous Film Forming Foam (AFFF) for compliance with environmental, safety, and health regulations. Assess agent compatability with next generation fire threats. Continue development of acceptable fire fighting agents.

(U) ($.508) Evaluate systems tailored to composite fire threats. Develop enhancements to Personnel Protection Equipment. Continue development of acceptable fire fighting systems.

(U) ($.311) Continue reduced manning evaluations. Develop techniques to minimize threat from involved ordnance. Optimize training apparatus and provide opportunities for training during agent/system testing. Continue development of acceptable fire fighting tactics.

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603216N Aviation Survivability	W1819 Carrier Vehicle Aircraft Fire Suppression System

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	0.977	0.992	1.037
(U) Adjustments from the President's Budget:	-0.024	-0.010	-0.011
(U) FY 2002 President's Budget Submit:	0.953	0.982	1.026

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 net decrease of $.024 million consists of a $.020 million decrease for reprioritization of requirements within the Navy, and a $.004 decrease for a Congressional recission. The FY 2001 net decrease of $.010 million consists of a $.001 million decrease for reprioritization of requirements within the Navy, a $.007 million decrease for a Congressional reduction, and a $.002 million decrease for a Congressional Recission. The FY 2002 net decrease of $.011 million consists of a $.003 million decrease for a reprioritization of requirements within the Navy, and a $.008 million decrease for economic assumptions.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

Related RDT&E: Not applicable

(U) D. ACQUISITION STRATEGY: Not applicable

(U) E. SCHEDULE PROFILE: Not applicable

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603216N Aviation Survivability				PROJECT NUMBER AND NAME W1819 Carrier Vehicle Aircraft Fire Suppression System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	WX	MISC	5.414	0.184	Various	0.440	Various			Continuing	Continuing	
Subtotal Product Development			5.414	0.184		0.440				Continuing	Continuing	
Remarks:												
Configuration Management	WX	MISC	1.360	0.357	Various	0.100	Various			Continuing	Continuing	
SBIR Assessment				0.009							0.009	
Subtotal Support			1.360	0.366		0.100				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)					DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603216N Aviation Survivability			PROJECT NUMBER AND NAME W1819 Carrier Vehicle Aircraft Fire Suppression System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX	MISC	2.933	0.422	Various	0.475	Various			Continuing	Continuing	
Subtotal T&E			2.933	0.422		0.475				Continuing	Continuing	
Remarks:												
Travel	WX	MISC	0.045	0.010	10/00	0.011	10/00			Continuing	Continuing	
Subtotal Management			0.045	0.010		0.011				Continuing	Continuing	
Remarks:												
Total Cost			9.752	0.982		1.026				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 44

FY 2002 RDT&E, N PROJECT JUSTIFICATION

Exhibit R-2a, RDT&E,N Project Justification Date: JUNE 2001

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603237N
PROGRAM ELEMENT TITLE: Deployable Joint Command and Control
PROJECT NUMBER: X3050
PROJECT TITLE: Deployable Joint Command and Control

COST ($ in Thousands)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
X3050 Deployable Joint Command and Control			50.0							50.0
Total P.E. Cost			50.0							50.0

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Future Command Center is a new FY 2002 RDT&E inititative to develop a new DoD approach for the future DoD command, control, and communications center. This effort will be an extended spiral development. Specifically, it will create a prototype command center, provide manning during the testing phase and keep it enable for deployment to support the Joint Task Force commands in real world situations, and be turned over to the unified commands when the next iteration of the spiral is ready for test. This is a DoD joint effort with the Navy as the lead Service. (A Minimum of one iteration of this effort will be a shipborne command center.)

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**						R-1 ITEM NOMENCLATURE 0603261N Tactical Airborne Reconnaissance					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Total PE Cost		**1.956**	**2.332**	**1.934**							
A2467 UAV CONOPS		**1.956**	**2.332***	**1.934**							
Quantity of RDT&E Articles Not Applicable											

* The FY 01 budget reflects a $0.400M Congressional Add for spares procurement for the Predator exectued under A2851; which has been decresed by $0.016M fpr Congressional Reductions.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides for the development of studies, analyses and demonstrations for Unmanned Aerial Vehicle (UAV) concept of operation (CONOP) development. Specifically:
UAV CONOPS Research: The efforts supported under this program provide studies of CONOPS for UAV integration into USN Battlespace Dominance Operations. Specifically, the CONOPS research will evaluate the roles UAV's play in network centric warfare, sensor-to-shooter, and time critical strike (TCS). Areas of interest include the joint utility Global Hawk (LVL II-IV) integration into carrier battle group operations. The lessons learned from this research directly support the development of DoN requirements for multi-role endurance (MRE) UAV.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603261N Tactical Airborne Reconnaissance					PROJECT NUMBER AND NAME A2467 UAV CONOPS Research					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**1.956**	**2.332**	**1.934**							
RDT&E Articles Qty Not Applicable											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides funding for concept of operation (CONOP) development, research and studies in the integration of tactical unmanned aerial vehicles into Naval Strike Warfare. The efforts supported under this program provide studies of CONOPS for UAV integration into USN Battlespace Dominance Operations. Specifically, the CONOPS research will evaluate the roles UAV's play in network centric warfare, sensor-to-shooter, and time critical strike. Areas of interest include the joint utility of Global Hawk (LVL II-IV) and Predator (LVL IV) integration into carrier battle group operations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:
   - (U) ($ 1.387) Provided UAV Support to the annual Desert Rescue VIII Joint Exercise at NAS Fallon. Specifically, Navy Predator UAV's were used in direct support of time critical strike (TCS level 4) armed reconnaissance, combat search and rescue, special operations insertions and extractions, and communications relay. Also, provided UAV support to Carrier Air Wing Three' s (CVW-3's) predeployment exercise at NAS Fallon. Specifically, Navy Predator's were used in direct support of battlespace airwing dominance missions. CVW-3 aircrew received training in UAV operations and employment and were responsible for vehicle and payload control (TCS level 4) during mission execution. Additionally, Navy Predator's were used to cue or be cued by other organic CVW reconnaissance assets like F-14 TARPS completely digital.
   - (U) ($ 0.569) Funded miscellaneous efforts including technical and management support.

2. FY 2001 PLANS:
   - (U) ($1.833) Continue studies and demonstrations for CONOPS development into Naval Strike Warfare.
   - (U) ($0.115) Funds miscellaneous efforts.
   - (U) ($0.384) Spares procurement for Predator

3. FY 2002 PLANS:
   - (U) ($1.824) Continue studies and demonstrations for CONOPS development into Naval Strike Warfare.
   - (U) ($0.110) Funds miscellaneous efforts.

R-1 SHOPPING LIST - Item No. 47

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA - 4	0603261N Tactical Airborne Reconnaissance	A2467 UAV CONOPS Research

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	1.964	1.956	1.950
(U) Adjustments from the President's Budget:	-0.008	0.376	-0.016
(U) FY 2002/2003 OSD Budget Submit:	1.956	2.332	1.934

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 net decrease consists of a $0.008 million decrease for a Congressional Rescission.
The FY 2001 net increase of $0.376 million consists of a $0.400 million increase for spares procurement for Predator UAV, a $0.016 million decrease for a Congressional Reduction, and a $0.003 million decrease for a reprioritization of requirements within the Navy and a $0.005 million decrease for a Congressional Rescission.
The FY 2002 net decrease of $0.016 million is due to a reprioritization of requirements within the Navy.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: N/A

(U) D. ACQUISITION STRATEGY: N/A

(U) E. SCHEDULE PROFILE: N/A

R-1 SHOPPING LIST - Item No. 47

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603261N Tactical Airborne Reconnaissance				PROJECT NUMBER AND NAME A2467 UAV CONOPS Research						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Product Development	WX	NSAWC Fallon ,Nevada	1.387	1.833	12/00	1.824	12/01					
Predator Spares *	RX	NPG Monterey, CA		0.384	12/00							
Subtotal Product Development			1.387	2.217		1.824						

Remarks: * Congressional Add for Spares procurement for Predators.

Subtotal Support			0.000	0.000		0.000						

Remarks:

R-1 SHOPPING LIST - Item No. 47

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)						DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603261N Tactical Airborne Reconnaissance			PROJECT NUMBER AND NAME A2467 UAV CONOPS Research						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Subtotal T&E			0.000	0.000		0.000						
Remarks:												
Government Engineering Support	WX	Various/NSWC Ind Hd. Md.	0.560	0.115	12/00	0.110	12/01					
Travel	WX	CNO-N88 Washington DC	0.009									
Subtotal Management			0.569	0.115		0.110						
Remarks:												
Total Cost			1.956	2.332		1.934						
Remarks:												

R-1 SHOPPING LIST - Item No. 47

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**				R-1 ITEM NOMENCLATURE Advanced Combat System Technology /0603382N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002							
Total PE Cost	**6.547**	**6.879**	**3.458**							
Advanced Combat System Technology/K0324	**6.547**	**6.879**	**3.458**							
Quantity of RDT&E Articles	**Not Applicable**									

A. (U) Mission Description and Budget Item Justification

The Advanced Combat System Technology line funds studies and experiments which will be conducted in distributed computer architecture, radar technology, and Tactical Informational Management Concepts in the Computing Testbed to mature them as transition candidates for introduction into the AEGIS Weapon System. This program will take a disciplined systems engineering approach to find how these advances can be integrated into the AEGIS system and subsequent combat systems, and to plan combat system baseline upgrade schedules. Fully Distributed Computing Architecture is the first advanced development effort, leveraging the joint AEGIS/Defense Advanced Research Projects Agency (DARPA) High Performance Distributive Computing (Hiper-D) technology effort. It implements the results of system engineering experiments with currently emerging Commercial-off-the-Shelf (COTS) computer technologies and distributed processing advances to replace the current AEGIS Combat System architecture with an open, distributed architecture. A significant priority of task will be complex Tactical Information Management of the flow and display of tactical information through the "detect-control-engage" process to better support the operator/decision maker. These advanced technologies are candidate systems for future baseline upgrades.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY00 ACCOMPLISHMENTS:
- (U) ($1.173) Continued system engineering experiments with currently emerging COTS/DARPA computer technologies and assessed improvements in capabilities against previously benchmarked capabilities. Provided feedback on existing technology shortfalls still needing improvement for use in weapon systems. Worked within the commercial standards communities addressing the shortfalls in computing capabilities for Navy applications.
- (U) ($3.246) Conducted integrated Demonstration 2000 in the Computing Testbed with selected AEGIS Weapon System capabilities focused on initial Theater Ballist Missle Defense (TBMD) capabilities running concurrently with Anti Air Warfare (AAW) capabilities in re-architected SPY and Weapon Control System (WCS) computer programs. Additionally, selected Quorum technologies were transitioned into the testbed. Transitioned second increment of Combat System Technlogies from Office of Naval Research (ONR) technology program.

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	R-1 ITEM NOMENCLATURE
RDT&E, N / BA 4	**ADV COMBAT SYS TECH/0603382N**	Advanced Combat System Technology /0603382N

U) FY00 ACCOMPLISHMENTS (CONT.)
- (U) ($1.162) Initiated transition efforts of lessons learned in the FY99 middleware risk reduction experiments targeted at the AEGIS combat systems. Additionally, provid multiple engineering level exchanges of lessons learned to the Common Command and Decision (CC&D) industry teams. Worked with the Baseline development teams to identify remaining or emerging issues associated with transition to Baseline 6 Phase III and Baseline 7 Phase I for open architecture capabilities.
- (U) ($0.966) Rearchitected SPY and WCS computer programs to conduct both AAW and TBMD mission capabilities simultaneously. Introduced new middleware technology to both elements computer programs.

(U) FY01 PLAN:
- (U) ($1.295) Continue system engineering experiments with currently emerging COTS and DARPA computer technologies to assess their applicability in meeting Aegis Combat System performance requirements and open system architecture objectives. Provide feedback on any existing shortfalls for future enhancements. Work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) ($3.097) Conduct an integrated demonstration in the Computing Testbed of selected Aegis Weapon System capabilities focused on transitioning them to the target Distributed Tactical Computing Environment (DTCE), based on emerging COTS technologies and DARPA Quality of Service technologies (attributes include: portability, scalability, fault tolerance and dynamic resource management).
- (U) ($1.200) Continue integration of lessons learned in the FY00 DTCE risk reduction experiments whose technologies include resource management, networking, operating systems, and middleware targeted at the Aegis Combat System. Work with baseline development teams to identify emerging issues associated with transitioning baselines 6.3, 7.1 and cruiser conversion baselines to an open architecture based on these technologies.
- (U) ($0.961) Develop an approach to certify Aegis Weapon Systems based on dynamically allocated system functions – critical to certifying operational combat system programs based on these technologies.
- (U) ($0.200) Assess system engineering and development tools and provide feedback to Aegis program and prime contractor.
- (U) ($0.126) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) FY02 PLAN:
- (U) ($0.400) Continue development and integration of DTCE capability based on COTS and DARPA technologies.
- (U) ($1.955) Conduct experiments focused on transition of selected Aegis Weapon System elements to the DTCE and document lessons learned with respect to performance and open system attributes. Matures certification methodologies and develop trial certification procedures.
- (U) ($0.103) Provide feedback to DARPA and to the Aegis prime contractor for incorporation into baseline developments.
- (U) ($1.000) Assess capability of DTCE to meet projected requirements of future baseline upgrades and missions, e.g. NTW and TBMD.

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	R-1 ITEM NOMENCLATURE
RDT&E, N / BA 4	**ADV COMBAT SYS TECH/0603382N**	Advanced Combat System Technology /0603382N

Program Change Summary:	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	6.790	6.943	6.989
Appropriated Value:	6.828	6.943	
Adjustments to FY2000/2001 Appropriated Value	-0.281	-0.064	
FY2001 President's Budget:			
FY 2002 PRES Budget Submit:	6.547	6.879	3.458

Funding:
FY 2000 funding decrease is due to reduction for SBIR (-$0.065), shifting Navy priorities ($-.134), across-the-board reduction (-$0.038), minor pricing adjustments ($-0.044).
FY2001 decrease is due to Congressional pro-rata reduction ($-.049) and a government-wide rescission ($-0.015).

Schedule: Not applicable.

Technical: Not applicable.

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
RDT&E, N / 1319 / BA 5										
PE0604307	240.898	200.330	262.037						CONT.	CONT.

C. Acquisition Strategy: Risk reduction efforts are lead by NSWC/DD, the AEGIS Combat System Lifetime Support Engineering Agent (LSEA). Results are transitioned to industry for cost and risk mitigation in the production of AEGIS Combat Systems.

D. Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**			PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**			PROJECT NAME AND NUMBER: Advanced Combat System Technology /K0324						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPFF	APL, Baltimore, MD	7.579	1.520	11/99	2.031	11/00	0.866	11/01	CONT.	CONT.	
Systems Engineering	WR	NSWC, Dahlgren,VA	9.905	3.875	12/99	4.074	12/00	2.241	12/01	CONT.	CONT.	
Systems Engineering	WR	NAWCAD, St. Inigoes, MD	2.000							CONT.	CONT.	
Subtotal Product Development			19.484	5.395		6.105		3.107		CONT.	CONT.	0.000
Remarks:												
Support	WR	Miscellaneous	0.405	0.230	11/99	0.260	11/00	0.072	11/01	CONT.	CONT.	
Subtotal Support			0.405	0.230		0.260		0.072		CONT.	CONT.	
Remarks:												
Test & Evaluation	WR	Miscellaneous	0.315	0.315	11/99	0.381	11/00	0.000	11/01	CONT.	CONT.	
Subtotal T&E			0.315	0.315		0.381		0.000		CONT.	CONT.	
Remarks:												
Program Management Support	WR	Miscellaneous	0.443	0.607	11/99	0.133	11/00	0.279	11/01	CONT.	CONT.	
Subtotal Management			0.443	0.607		0.133		0.279		CONT.	CONT.	
Remarks:												
Total Cost			20.647	6.547		6.879		3.458		CONT.	CONT.	

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Surface and Shallow Water Mine Countermeasure/0603502N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**107.938**	**101.984**	**135.284**						**CONT.**	**CONT.**
Remote Minehunting System/Q0260/Q2387	**47.525**	**45.277**	**59.165**						**CONT.**	**CONT.**
Integrated Combat Weapons System/Q1233	**19.503**	**17.701**	**14.749**						**CONT.**	**CONT.**
Unmanned Underwater Vehicle/Q2094	**0.000**	**27.384**	**56.088**						**CONT.**	**CONT.**
Shallow Water Mine Countermeasure/Q2131	**11.061**	**11.622**	**5.282**						**CONT.**	**CONT.**
Unmanned Underwater Vehicle/V2094	**29.849**	**0.000**	**0.000**						**CONT.**	**CONT.**
Quantity of RDT&E Articles										

A. Mission Description and Budget Item Justification: The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, channels, choke points, sea lines of communications and amphibious and other fleet operating areas. It develops: (1) organic remote minehunting capability for DDG-51 Class and other surface combatants; (2) the integration and improvement of systems and support for systems which will detect, localize and classify moored, bottom, and close-tethered mines for use in Mine Countermeasure (MCM) MCM-1 Class, Mine Hunter Coastal (MHC) MHC-51 Class, and other surface ships; (3) systems for neutralizing mines and light obstacles from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations; (4) near-term and long-term Unmanned Undersea Vehicle (UUV) systems for clandestine mine reconnaissance.

B. Program Change Summary:	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	109.765	97.929	121.193
Appropriated Value:	107.465	102.929	
Adjustment to FY 2000/2001 Appropriated Value/ FY2001 President's Budget:	0.473	-0.945	14.091
FY 2002 PRES Budget Submit:	107.938	101.984	135.284

Funding: FY00; (-1.827) SBIR/misc adj, (+2.300) NMRS prog completion; FY01; (-0.945) Gov't reduction/rescission; FY02; (+1.098) RMS Spares, (-10.400) Non SQQ-89 RMS decrease, (-12.800) Offsets Organic MCM RMS, (-1.098) Offsets Organic MCM RMS Spares, (+17.000) Organic MCM Add back RMS, (+.335) Continue MEDAL program, (+4.702) ICWS Realignment, (+32.000) Unmanned Undersea Vehicle Realignment, (-2.700), ABS Re-structure, (-2.800) LCAC Fix, (-7.200) CNO Buybacks - ABS, (-4.000) DET/SABRE, (-.131) Final POM02 Balance, (-.405) NWCF rate changes, (+.332) Program Support, (+.158) Inflation adjustment.

Schedule: DET/SABRE : MS III has slipped due to funding contraints; RMS: PDR and CDR slipped by one quarter; MEDAL: Schedules were adjusted to accomodate the GCCS schedule; ICWS: PDR, CDR, and subsystem integration and test slipped because of a delay in contract award.

Technical: Not Applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**				PROJECT NAME AND NUMBER Remote Minehunting Systems/Q0260/Q2387					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**47.525**	**45.277**	**59.165**						**CONT.**	**CONT.**
RDT&E Articles Qty	**2**									

A. Mission Description and Budget Item Justification: The Remote Minehunting System (RMS), AN/WLD-1(V), program develops a new remotely operated minehunting system for surface ships. This effort includes development and integration of a remote vehicle, mine-hunting sensors, mission command and control, and installation into the DDG-51 Class Flight IIA Baseline 7 and AN/SQQ-89(V)15 Undersea Warfare Combat System.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS
Product Development
- (U) ($19.087) Primary Hardware Development - Began Preliminary/Critical Design and fabrication of Engineering Development Models (EDMs) for the RMS.
- (U) ($ 4.100) System Engineering - Continued System Engineering for the RMS EDMs including Preliminary Design Review (PDR) Effort.
- (U) ($ 1.682) Incentive Fee for Critical Item Testing (CIT) and PDR.

Development Support
- (U) ($ 3.903) Software Development - Continued software design/Code/Test for the RMS.
- (U) ($ 2.500) Integrated Logistic Support - Continued ILS Planning and Interactive Electronic Technical Manual (IETM) Development for RMS.
- (U) ($ 7.401) Ship Integration - Continued Integration Support for the RMS on DDG51 Flight IIA ship class including support for AN/SQQ-89(V)15.

Test and Evaluation
- (U) ($ 4.009) Developmental Test and Evaluation - Began RMS Critical Item Testing (CIT) for the RMV and Launch and Recovery (L&R) subsystems.

Support
- (U) ($4.783) Program Management Support
- (U) ($ .060) Travel

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Remote Minehunting Systems/Q0260/Q2387	

2. (U) FY 2001 PLAN
Product Development
- (U) ($11.124) Primary Hardware Development - Complete Preliminary and Continue Critical Design and fabrication of Engineering Development Models (EDMs) for the RMS.
- (U) ($ 3.700) System Engineering - Continue System Engineering for the RMS EDMs including completion of PDR and continue Critical Design Support.
- (U) ($ 1.230) Award Fees - Incentive Fee for L&R subsystem CDR.

Development Support
- (U) ($ 3.933)Software Development-Continue software design/Code/Test for the RMS.
- (U) ($ 3.900) Integrated Logistic Support - Continue ILS Planning and IETM Development for RMS.
- (U) ($ 8.450) Ship Integration - Continue Integration Support for the RMS on DDG51 Flight IIA ship including support for AN/SQQ-89(V)15 ECP.

Test and Evaluation
- (U) ($ 6.500) Developmental Test and Evaluation - Continue RMS Critical Item Testing (CIT).

Support
- (U) ($5.320) Program Management Support
- (U) ($ .060) Travel
- (U) ($1.060) Portion of extramural program reservedfor Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN
Product Development
- (U) ($13.404) Primary Hardware Development - Complete Critical Design and continue fabrication of Engineering Development Models (EDMs) for the RMS.
- (U) ($11.300) System Engineering - Continue System Engineering for the RMS EDMs including supporting Critical Design Review and begin system engineering for providing RMS to Non-DDG Class Ships.
- (U) ($ 1.809) Award Fees - Incentive Fee for CDR.

Development Support
- (U) ($ 5.100) Software Development - Continue software design/Code/Test for the RMS.
- (U) ($ 6.200) Integrated Logistic Support - Continue ILS Planning and IETM Development for RMS.
- (U) ($ 2.200) Ship Integration - Continue Integration Support for the RMS on DDG51 Flight IIA ship including support for AN/SQQ-89(V)15 ECP.

Test and Evaluation
- (U) ($ 11.740) Developmental Test and Evaluation - Begin RMS Operational Assessment DT/OA Test for the RMS Shipboard Equipment.

Support
- (U) ($7.352) Program Management Support
- (U) ($ .060) Travel

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Remote Minehunting Systems/Q0260/Q2387	

B. OTHER PROGRAM FUNDING SUMMARY

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	TO COMPLETE	TOTAL COST
(U) OPN RMS Line 262200	0.000	0.000	0.000						CONT.	CONT.
(U) RDT&E PE 0604373 Q0529	15.140	17.804	8.747						0.000	42.671

C. Acquisition Strategy: The government has issued a series of contract modifications to Lockheed Martin to complete efforts through the System Design Review. Based upon the approved Milestone II decision the program office issued the contract modification to complete the Critical Design Review (CDR); upon completion of CDR a firm fixed price sole source contract will be awarded to Lockheed Martin to complete the development, fabrication, and testing of the engineering development models, initial pilot line/tooling, and timed phased procurement of initial systems to meet ship delivery schedules. The government has worked with the contractor in an IPT environment to refine the specification and Statement of Work for the overall development effort. The IPT pricing process was used to generate the cost estimates against Navy requirements. The government will pursue commonality between the AN/ AQS-20X airborne minehunting system and the AN/WLD-1(V)1. AN/WLD-1(V)1 contract plan is for the development of two (2) EDMs, system interactive electronic technical manual (IETM), provisioning data, technical drawings and data, and engineering services.

D. Schedule Profile: See Attached

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Remote Minehunting Systems/Q0260/Q2387

AN/WLD-1(V)1 PROGRAM SCHEDULE

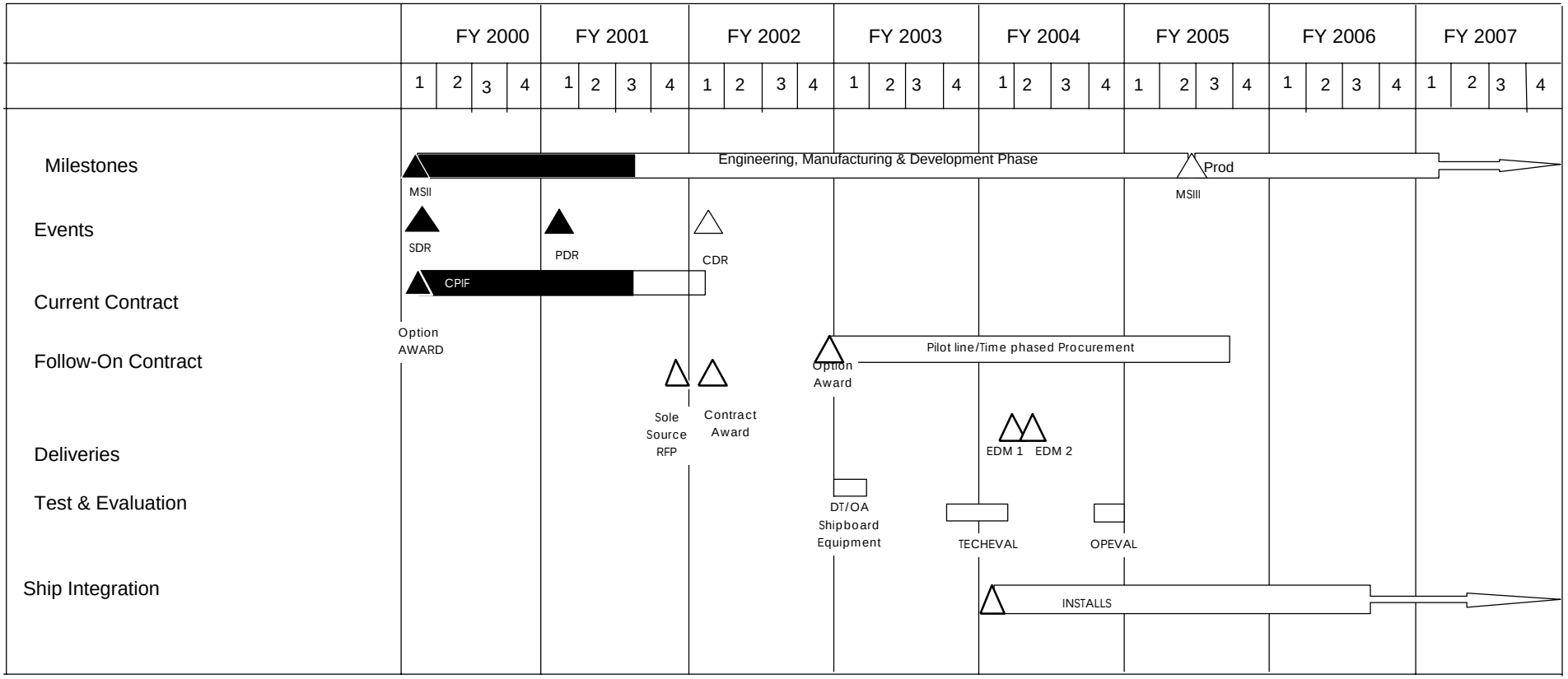

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N , BA-4** | PROGRAM ELEMENT: **Surface & Shallow Water MCM, 0603502N** | PROJECT NAME AND NUMBER: Remote Minehunting System/Q0260/Q2387

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPFF/IF	Lockheed Martin	113.085	18.287	11/99	10.324	11/00	13.304	11/01	CONT.	CONT.	N/A
Primary Hardware Development	WR	NSWC, CSS	0.300	0.800	12/99	0.800	12/00	0.100	12/01	CONT.	CONT.	
Systems Engineering	C/CPFF/IF	Lockheed Martin	0.000	3.900	11/99	3.200	11/00	3.600	11/01	CONT.	CONT.	
Systems Engineering	WR	NSWC, CSS	0.000	0.200	12/99	0.500	12/00	0.300	12/01	CONT.	CONT.	
Systems Engineering*	Various	Various						7.400	12/01	CONT.	CONT.	
GFE												
Award Fees			4.800	1.682	05/00	1.230	05/01	1.809	03/02	N/A	N/A	N/A
Subtotal Product Development			118.185	24.869		16.054		26.513				

Remarks: GFE - AN/AQS-20 systems provided to RMS program were funded under PE 0604373/Q0529
* FY02 and FY03 System Engineering includes various funding of $12.800M for beginning RMS inclusion on Non-DDG class ships.

Development Support Equipment												
Software Development	C/CPFF/IF	Lockheed Martin	2.700	3.202	11/99	3.433	11/00	4.500	11/01	CONT.	CONT.	
Software Development	WR	NSWC, CSS	0.200	0.701	12/99	0.500	12/00	0.600	12/01	CONT.	CONT.	N/A
ILS	C/CPFF/IF	Lockheed Martin	0.500	2.300	11/99	3.700	11/00	5.900	11/01	CONT.	CONT.	
ILS	WR	NSWC, CSS	1.400	0.200	12/99	0.200	12/00	0.300	12/01	CONT.	CONT.	N/A
Ship Integration	C/CPFF	Lockheed Martin	0.000	0.200	11/99	1.300	11/00	1.100	11/01	CONT.	CONT.	
Ship Integration**	Various	Various	2.000	7.201	12/99	7.150	12/00	1.100	12/01	CONT.	CONT.	
Subtotal Support			6.800	13.804		16.283		13.500		CONT.	CONT.	

Remarks: ** Various in Ship Integration provides funding to support AN/SQQ-89(V)15 ECP effort for RMS and PMS400 RMS DDG ship class integration efforts.

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N , BA-4**		PROGRAM ELEMENT **Surface & Shallow Water MCM, 0603502N**				PROJECT NAME AND NUMBER Remote Minehunting Systems/ Q0260/Q2387						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	C/CPFF/IF	Lockheed Martin	15.370	4.009	11/99	6.500	11/00	10.240	11/01	CONT.	CONT.	N/A
Developmental Test & Evaluation	WR	NSWC, CSS						1.500	12/01	CONT.	CONT.	
Tooling												
GFE												
Subtotal T&E			15.370	4.009		6.500		11.740		CONT.	CONT.	
Remarks:												
Contractor Engineering Support	C/CPFF/IF	Lockheed Martin	4.500							0.000	4.500	
Government Engineering Support	WR	NSWC, CSS	34.600							0.000	34.600	N/A
Program Management Support	Various	Various	1.100	4.783	Various	6.380	Various	7.352	Various	CONT.	CONT.	N/A
Travel	Various	NAVSEA	0.060	0.060	Various	0.060	Various	0.060	Various	CONT.	CONT.	N/A
Labor (Research Personnel)												
Overhead												
Subtotal Management			40.260	4.843		6.440		7.412		CONT.	CONT.	
Remarks: Award dates for management are various because multiple activities are receiving tasks at different times during the fiscal year.												
Total Cost			180.615	47.525		45.277		59.165				
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**				PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**19.503**	**17.701**	**14.749**						**CONT.**	**CONT.**
RDT&E Articles Qty	**1 ADM**	**3 EDM**								

Mission Description and Budget Item Justification: (1) Integrated Combat Weapon System (ICWS) is a series of major, incremental block upgrades to the current combat systems. It provides the MCM/MHC Class Ships an affordable and fully integrated combat weapons system which will improve mission execution efficiency, dramatically reduce life-cycle costs, and facilitate changes to meet future mission requirements. (2) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System – Maritime (GCCS-M). MEDAL provides mine and minewarfare planning and evaluation tools and databases to the MCM Commander. (3) Organic MCM C4I connectivity to the rest of the fleet is provided through GCCS-M; design and implement MIW C4I Surveillance and Reconnaissance (C4ISR) architecture to fully integrate and optimize organic and dedicated systems within the Navy's C4ISR architecture; (4) MCS/MCM Ship Studies determine requirements for future surface-airborne mine countermeasures cababilities to meet the Navy's needs in countering sea mines.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS
(U) ICWS Block I
Product Development
- (U) ($2.200) Primary Hardware Development - Began hardware design for ICWS and fabricated an Advanced Design Model (ADM).
- (U) ($ .439) Award Fees
Development Support Equipment
- (U) ($10.283) Software Development - Began software design/code/test for ICWS. Conducted SDR and PDR.
- (U) ($ .132) Software Development - Developed interface for MEDAL to AN/SYQ-13
- (U) ($ .100) Software Development - Performed MCM autopilot study
- (U) ($ .900) Software Development - Performed Tactical Decision Aid (TDA) study
- (U) ($ .090) Software Development - Sonar algorithm development
Support
- (U) ($ .361) Support - Program management support

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Integrated Combat Weapons System/Q1233/Q2388

1. (U) FY 2000 ACCOMPLISHMENTS Continued

(U) MEDAL
Development Support Equipment
- (U) ($.040) Software Development - Sonar modeling
- (U) ($.718) Software Development - Configural minefield planning Tactical Decision Aid (TDA)
- (U) ($.546) Software Development - Performed TDA study. Began Build 8 development.

Support
- (U) ($.203) Program Management Support

(U) ORGANIC MCM C4I
Product Development
- (U) ($3.035) System Engineering - Began MUW C4ISR architecture/data requirements for data infusion, file format, structure, and transmission requirements for (organic/dedicated) MIW systems. Began MUW data content standards characterization and C4ISR architecture development. Began to develop and conduct MOD/SIM to optimize organic and dedicated systems.

Support
- (U) ($.456) Program Management Support

2. (U) FY 2001 PLANS
(U) ICWS Block I
Product Development
- (U) ($ .886) Primary Hardware Development - Continue hardware design for ICWS. Begin EDM fabrication.
- (U) ($3.500) Primary Hardware Development - Award option for fully ruggedized and qualified EDM for Mine Warfare Training Center (MWTC).
- (U) ($ .176) Award Fees

Development Support Equipment
- (U) ($4.269) Software Development - Continue software design/code/test for ICWS. Conduct CDR and begin subsystem integration and test.

Support
- (U) ($ .822) Support - Program management support
- (U) ($ .332) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Integrated Combat Weapons System/Q1233/Q2388

2. (U) FY 2001 PLANS Continued
(U) MEDAL
Development Support Equipment
- (U) ($ .750) Software Development - Configural minefield planning TDA
- (U) ($1.514) Software Development - Continue MEDAL software port to NT, and begin integration and testing on Build 8. Initiate development of Build 9.
- (U) ($ .900) Software Development - Tactical Decision Aid (TDA) study
Support
- (U) ($ .313) Program Management Support

(U) ORGANIC MCM C4I
Product Development
- (U) ($2.975) System Engineering - Continue MUW C4ISR architecture/data requirements. Continue MUW data content standards characterization. Continue MOD/SIM effort.
Support
- (U) ($.475) Program Management Support

(U) MCS/MCM SHIP STUDIES
Product Development
- (U) ($ .428) System Engineering - Complete study of alternatives to replace or retain MCS-12 (USS INCHON).
- (U) ($ .252) System Engineering - Complete study of alternatives for follow-on class of surface mine countermeasures ships.
Support
- (U) ($ .109) Program Management Support

3. (U) FY 2002 PLANS
(U) ICWS Block I
Product Development
- (U) ($1.004 Primary Hardware Development - Continue hardware design for ICWS
- (U) ($ .790) Award Fees
Development Support Equipment
- (U) ($5.359) Software Development - Complete software design/code/test for ICWS, complete subsystem integration and testing, and begin EDM 1 integration and testing.
Support
- (U) ($1.425) Program management support

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Integrated Combat Weapons System/Q1233/Q2388

2. (U) FY 2002 PLANS Continued

(U) MEDAL
Development Support Equipment
- (U) ($2.031) Software Development - Complete Build 8. Complete development of Build 9 and initiate integration and testing. Initiate the development of Build 10.
Support
- (U) ($ .344) Program Management Support

(U) ORGANIC MCM C4I
Product Development
- (U) ($3.257) System Engineering - Complete MUW data content standards characterization. Complete MUW C4ISR architecture/data requirements. Continue MOD/SIM effort. Initiate and implement Phase 1 of the design of MUW Network Centric Warfare database and support network. Initiate and complete MEDAL/TEDS integration, MUW network centric warfare collaborative planning tools, and MCM/MHC classified LAN integration design. Initiate organic/dedicated MUW tactics development. Begin planning and evaluation models/algorithms. Update C4I SR assessment plan.
Support
- (U) ($.539) Program Management Support

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Integrated Combat Weapons System/Q1233/Q2388	

B. OTHER PROGRAM FUNDING SUMMARY

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
(U) OPN (ICWS)	9.431	5.437	2.051						CONT.	CONT.
Line 262200										

C. ACQUISITION STRATEGY

ICWS is a series of major incremental upgrades to the current systems. The original equipment manufacturers have teamed with the Navy to develop the changes. FY 00 through FY 03 tasks will be accomplished under Cost Plus Incentive Fee (CPIF) contract. Contract was awarded in FY00. MEDAL is an evolutionary program with a development cycle of one year per software build to coincide with GCCS-M build schedule.

D. SCHEDULE PROFILE

See attached

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388

ICWS BLOCK 1 PROGRAM SCHEDULE

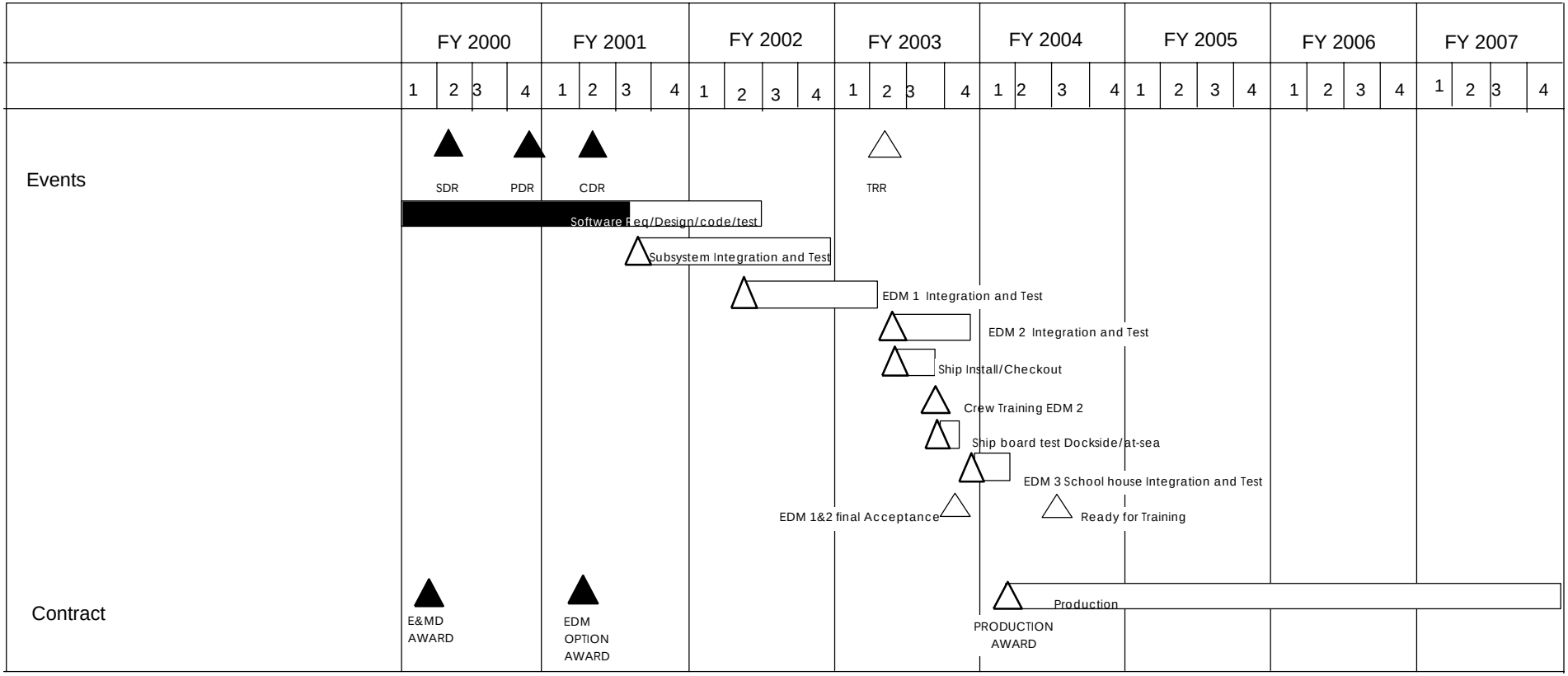

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388	

MEDAL PROGRAM SCHEDULE

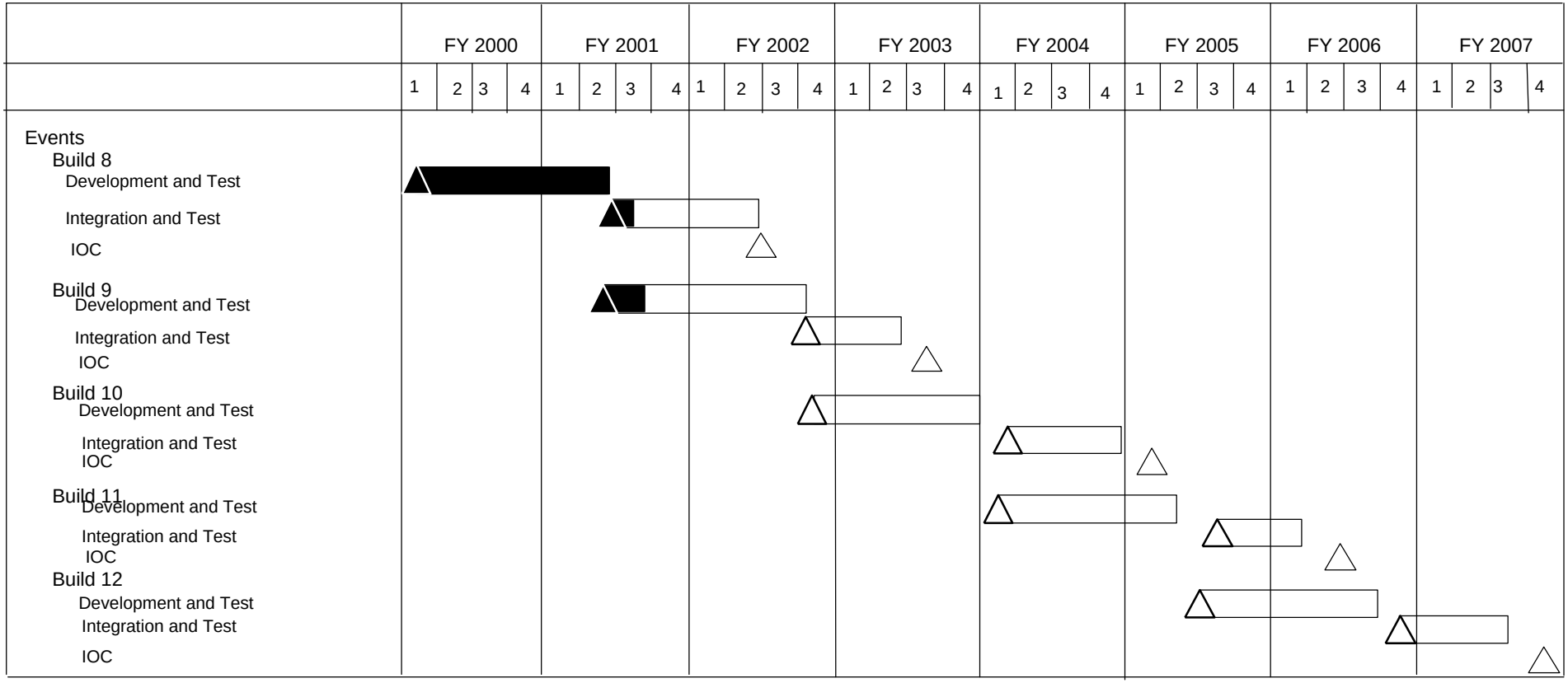

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388

MUW C4ISR PROGRAM SCHEDULE

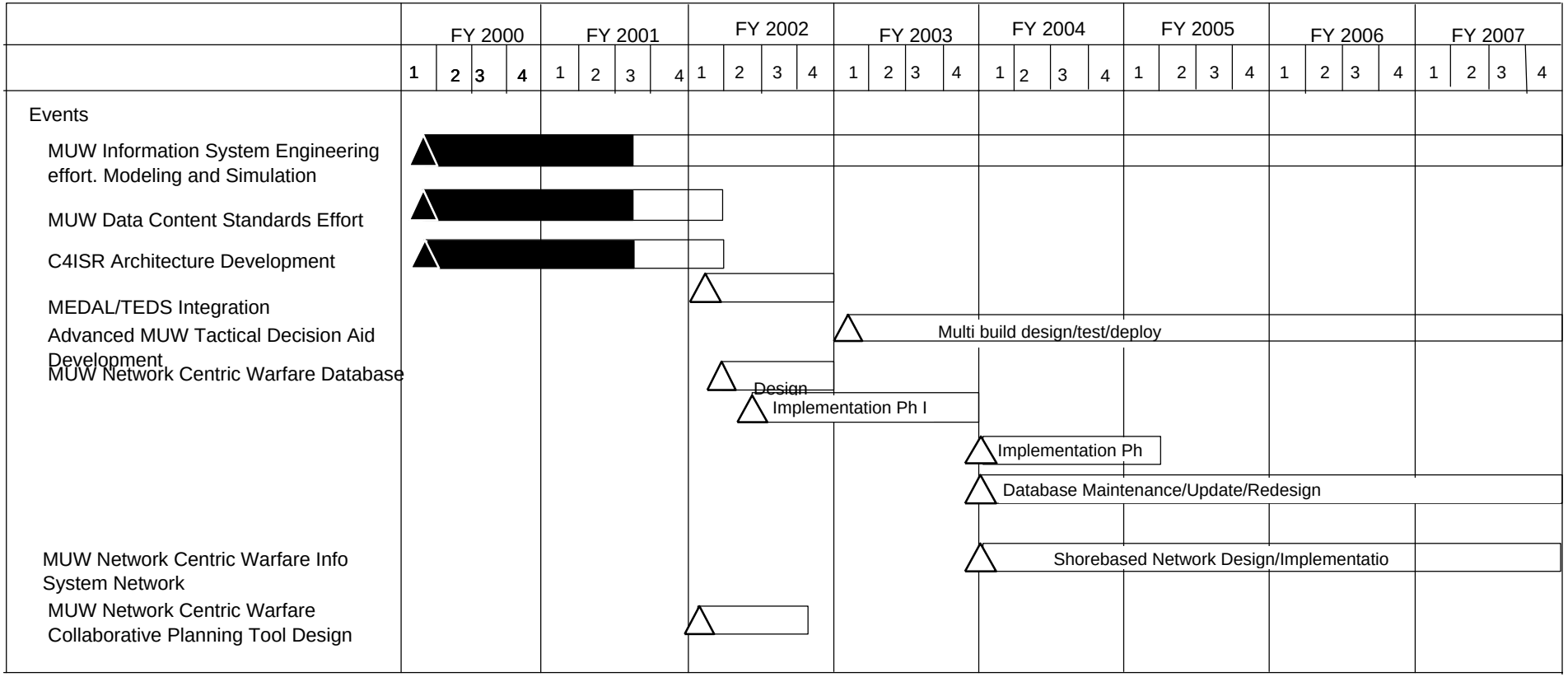

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388

MUW C4ISR PROGRAM SCHEDULE CONT'D

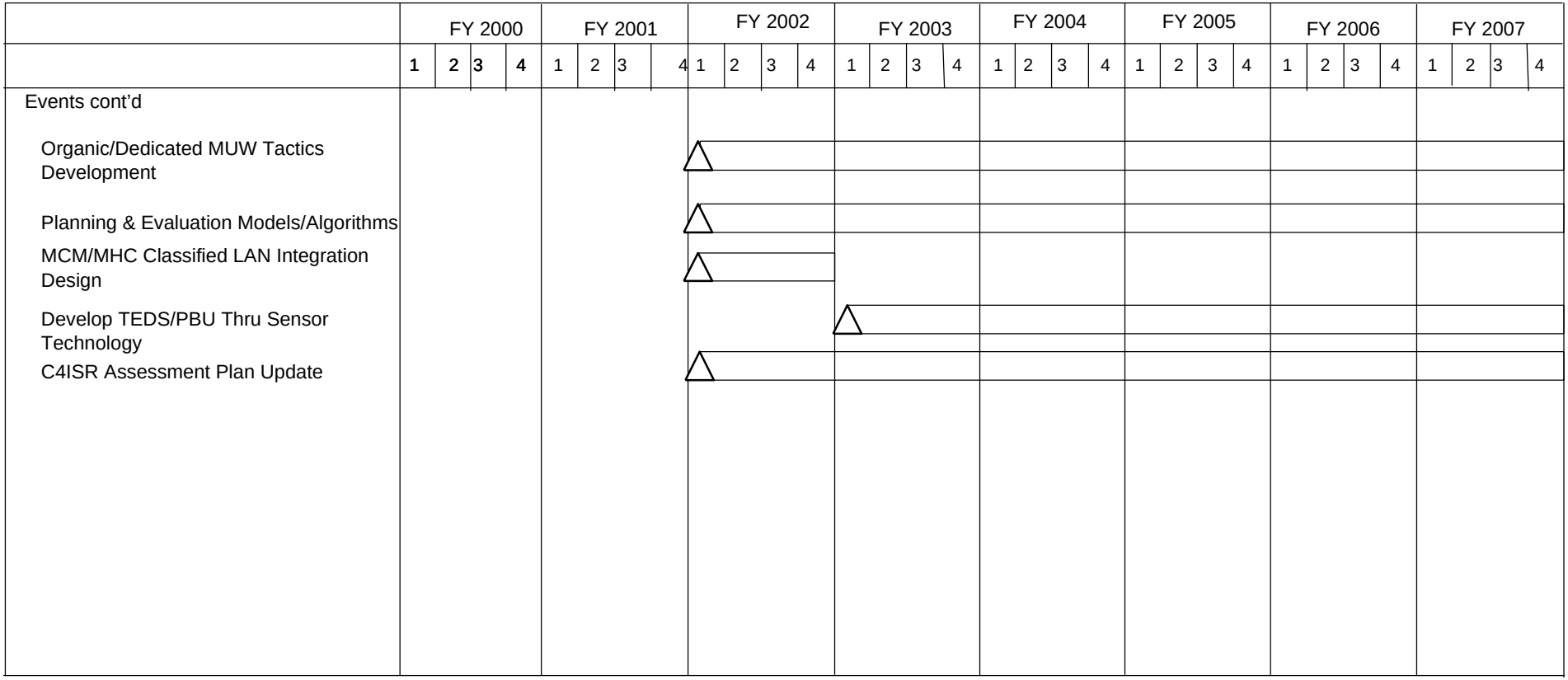

Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4**

PROGRAM ELEMENT: **Surface & Shallow Water MCM/0603502N**

PROJECT NAME AND NUMBER: Integrated Combat Weapons System/Q1233/Q2388

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPIF	Raytheon, RI	0.760	2.200	11/99	4.386	11/00	1.004	11/01	CONT.	CONT.	N/A
Ancillary Hardware Development												
Systems Engineering	Various	NSWC, CSS/NAVAIR	1.215	3.035	11/99	3.655	11/00	3.257	11/01	CONT.	CONT.	N/A
Licenses												
Tooling												
GFE												
Award Fees	SS/CPIF	Raytheon, RI	0.000	0.439	11/99	0.176	11/00	0.790	11/01	CONT.		
Subtotal Product Development			1.975	5.674		8.217		5.051		CONT.	CONT.	

Remarks:

Development Support Equipment												
Software Development	SS/CPIF	Raytheon, RI	0.250	10.283	11/99	4.220	11/00	4.807	11/01	CONT.	CONT.	
Software Development	WR,PD	NSWC/CD,ARL/UT,NAVSES	5.807	2.526	11/99	3.213	11/00	2.583	11/01	CONT.	CONT.	
Configuration Management												
Technical Data			0.100									
GFE												
Subtotal Support			6.157	12.809		7.433		7.390		CONT.	CONT.	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Surface & Shallow Water MCM/0603502N**			PROJECT NAME AND NUMBER Integrated Combat Weapons System/Q1233/Q2388						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation			0.200								0.200	N/A
Operational Test & Evaluation			1.592								1.592	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			1.792	0.000		0.000		0.000		0.000	1.792	
Remarks:												
Contractor Engineering Support			0.153								0.000	
Government Engineering Support			0.500								0.000	
Program Management Support	VAR	NAVSEA	0.290	1.020	11/99	2.051	11/00	2.308	11/01	Cont.	Cont.	N/A
Travel			0.100								0.100	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			1.043	1.020		2.051		2.308		Cont.	6.514	
Remarks:												
Total Cost			10.967	19.503		17.701		14.749				
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**				PROJECT NAME AND NUMBER Assault Breaching Systems/Q2131					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**11.061**	**11.622**	**5.282**						**CONT.**	**CONT.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: This program provides for a combination of joint US Marine Corps and US Navy projects planned to counter the threat to amphibious landing forces from known and projected foreign land and sea mines and light obstacles in the shallow water, very shallow water and surf zone approaches to amphibious assault areas. It develops systems for mine sweeping and explosive mine clearance. Included are the Distributed Explosives Technology (DET), Shallow Water Assault Breach System (SABRE), incremental enhancements to assault breaching mission (lane marking, obstacle breaching, and launch control safety), and follow-on Far Term efforts.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Assault Breaching Systems/Q2131

1. (U) FY 2000 ACCOMPLISHMENTS
(U) SABRE
Product Development
- (U) ($1.083) Primary Hardware Development - Manufacture DT II hardware
Development Support
- (U) ($ .031) Integrated Logistic Support
- (U) ($ .089) Configuration Management.
- (U) ($ .025) Technical Data - Updated technical drawing package.
Test and Evaluation
- (U) ($ .836) Developmental Test and Evaluation - Continued DT-II testing.
Support
- (U) ($2.592) Government Engineering Support - Began MOD 2 fuze development.
- (U) ($ .025) Travel - Attended meetings and test events.
- (U) ($ .314) Program Management Support
(U) DET
-Product Development
- (U) ($2.222) Primary Hardware Development - Procured and Manufactured DT II and OT systems.
- (U) ($ .125) Government Furnished Equipment - Procured mine threats for DT testing.
Development Support
- (U) ($ .231) Integrated Logistic Support - Tech manual and training support.
- (U) ($ .060) Configuration Management - Updated Technical Data Package (TDP) with changes from DET and fuze modifications.
Test and Evaluation
- (U) ($ .212) Operational Test and Evaluation - Began pre-OT set up survey at OT site.
- (U) ($1.204) Developmental Test and Evaluation - Continued DT-IIB testing and fuze engineering tests.
Support
- (U) ($1.368) Government Engineering Support - Began MOD 2 fuze development.
- (U) ($ .079) Contractor Engineering Support
- (U) ($ .540) Program Management Support
- (U) ($ .025) Travel

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Assault Breaching Systems/Q2131

2. (U) FY 2001 PLANS
(U) SABRE
Support
- (U) ($ 1.026) Government Engineering Support - Program terminated. Funds required for disposition of hazardous and explosive material.

(U) DET
-Product Development
- (U) ($ .024) Primary Hardware Development - Complete DET system development.
Development Support
- (U) ($ .150) Integrated Logistic Support - Training development and support.
- (U) ($ .020) Configuration Management - Complete Technical Data Package (TDP).
Test and Evaluation
- (U) ($ .443) Operational Test and Evaluation - Complete OT testing.
Support
- (U) ($ .730) Government Engineering Support - Complete DET development, support MSIII, and provide TDA engineering.
- (U) ($ .274) Program Management Support
- (U) ($ .025) Travel

(U) ABS Incremental Enhancements
Product Development
- (U) ($1.200) Primary Hardware Development - Develop incremental enhancements to support ABS mission including lane marking, obstacle breaching and launch control safety.
- (U) ($ .100) Systems Engineering - Support incremental enhancements
Development Support
- (U) ($ .100) Integrated Logistic Support - Support incremental enhancements
- (U) ($ .075) Configuration Management - Support TDP for incremental enhancements.
- (U) ($ .063) Technical Data - Prepare TDP to support incremental enhancements.
Support
- (U) ($ .800) Government Engineering Support - Design Agent (DA) engineering support.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Assault Breaching Systems/Q2131

2. (U) FY 2001 PLANS continued
(U) Far term System Development
Product Development
- (U) ($ .925) Primary Hardware Development - Risk reduction and preparation for far term
- (U) ($ .540) Systems Engineering - Far term preparation
- (U) ($ .225) Government Furnished Equipment - Mine threat procurement for far term development.

Development Support
- (U) ($ .100) Integrated Logistic Support - Risk reduction and far term system preparation
- (U) ($ .100) Configuration Management - Support far term system development
- (U) ($ .200) Technical Data - Support far term system development

Support
- (U) ($3.888) Government Engineering Support - TDA/DA engineering support.
- (U) ($ .546) Program Management Support
- (U) ($ .025) Travel
- (U) ($ .043) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLANS
(U) Far term System Development
Product Development
- (U) ($ .400) Primary Hardware Development - Risk reduction and preparation for far term
- (U) ($ .300) Systems Engineering - Far term preparation
- (U) ($ .200) Government Furnished Equipment - Mine threat procurement for far term development.

Development Support
- (U) ($ .100) Integrated Logistic Support - Risk reduction and far term system preparation
- (U) ($ .050) Configuration Management - Support far term system development
- (U) ($ .050) Technical Data - Support far term system development

Support
- (U) ($2.690) Government Engineering Support - TDA/DA engineering support.
- (U) ($1.442) Program Management Support
- (U) ($ .050) Travel

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Assault Breaching Systems/Q2131	

B. OTHER PROGRAM FUNDING SUMMARY

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	TO COMPLETE	TOTAL COST
(U) OPN (SWMCM Line 262400	11.323	16.248	0.000						0	34.827

C. Acquisition Strategy: The planned tasks for FY 01,02,03 will be accomplished to support the AOA "in an effort" to reduce cost and schedule risk associated with integrating unique mine kill mechanisms into conventional weapons systems.

D. Schedule Profile

See attached

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Assault Breaching Systems/Q2131

DET PROGRAM SCHEDULE

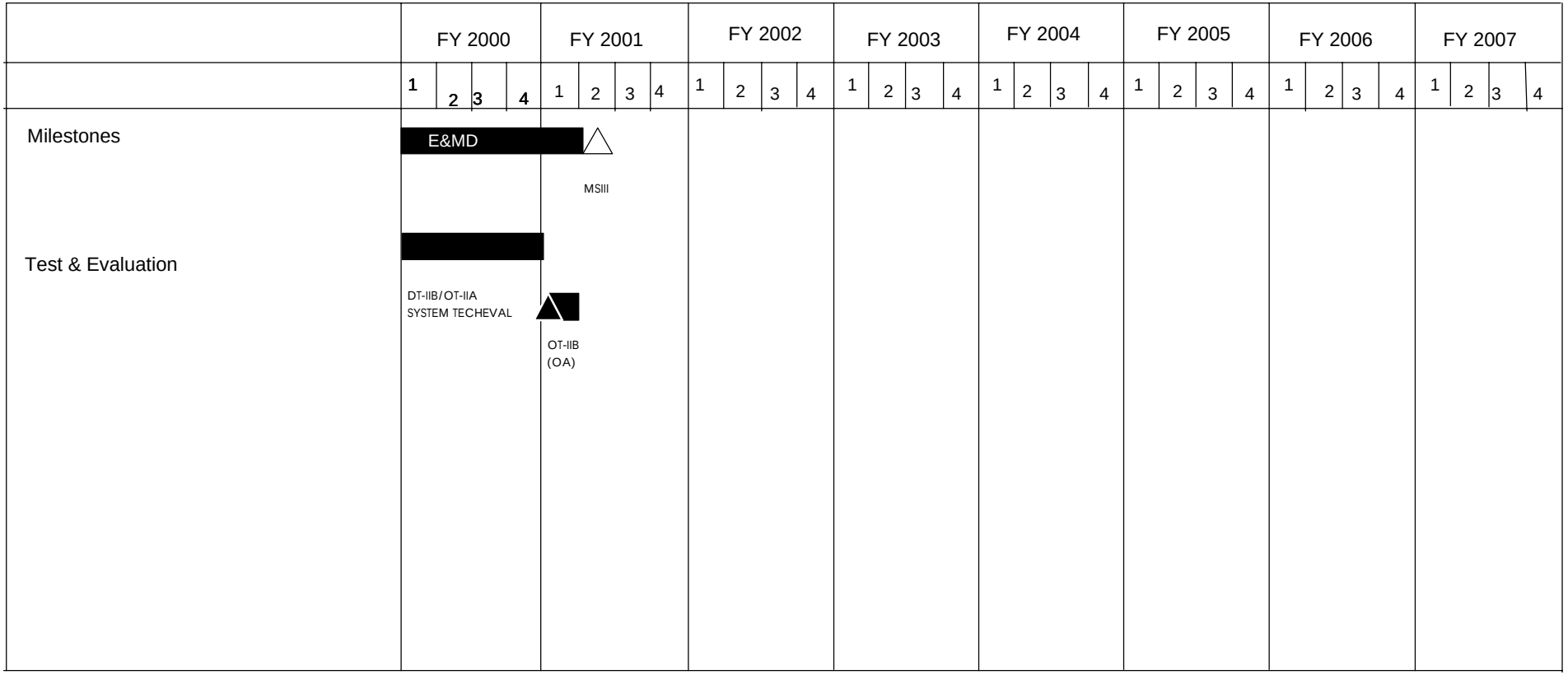

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Surface & Shallow Water MCM, 0603502N**	Assault Breaching Systems/Q2131	

SABRE PROGRAM SCHEDULE

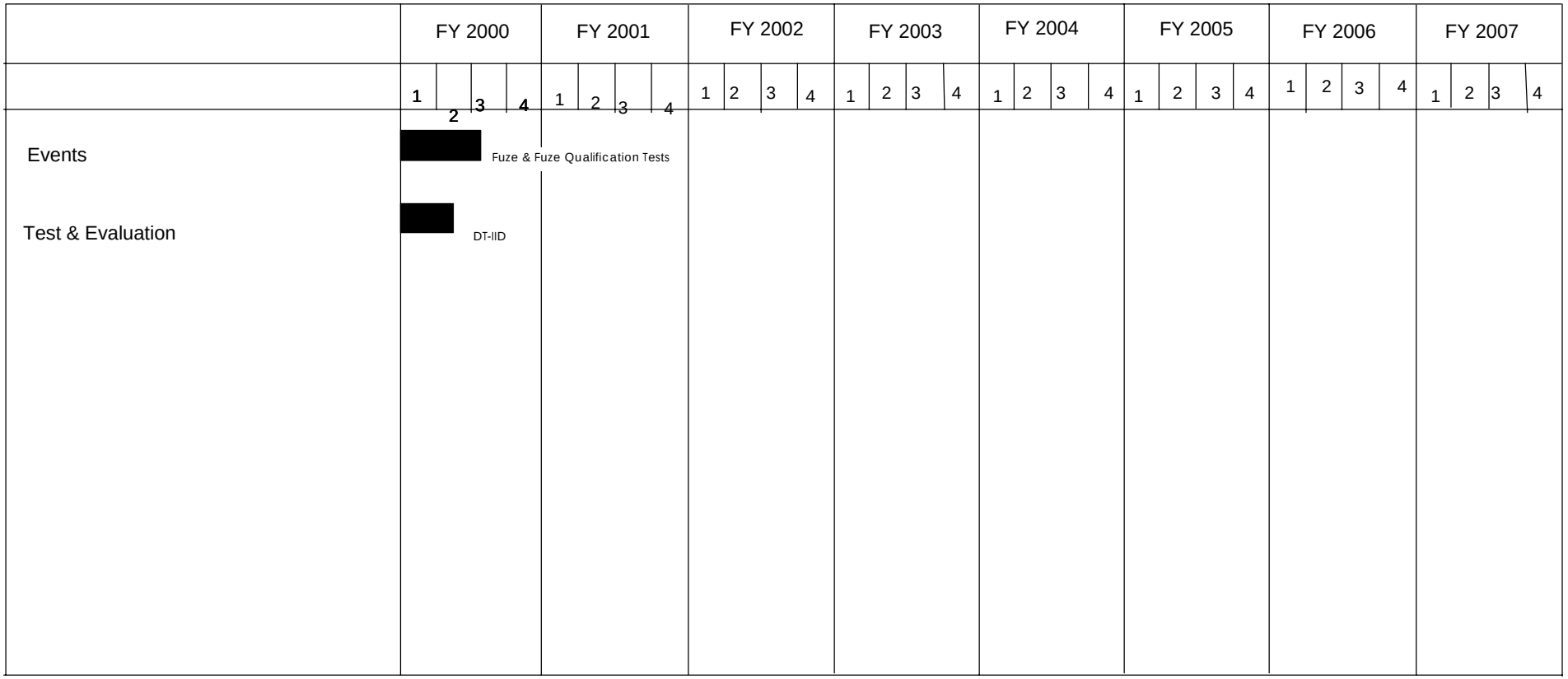

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 20001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface & Shallow Water MCM, 0603502N**	PROJECT NAME AND NUMBER Assault Breaching Systems/Q2131

ABS FAR-TERM PROGRAM SCHEDULE

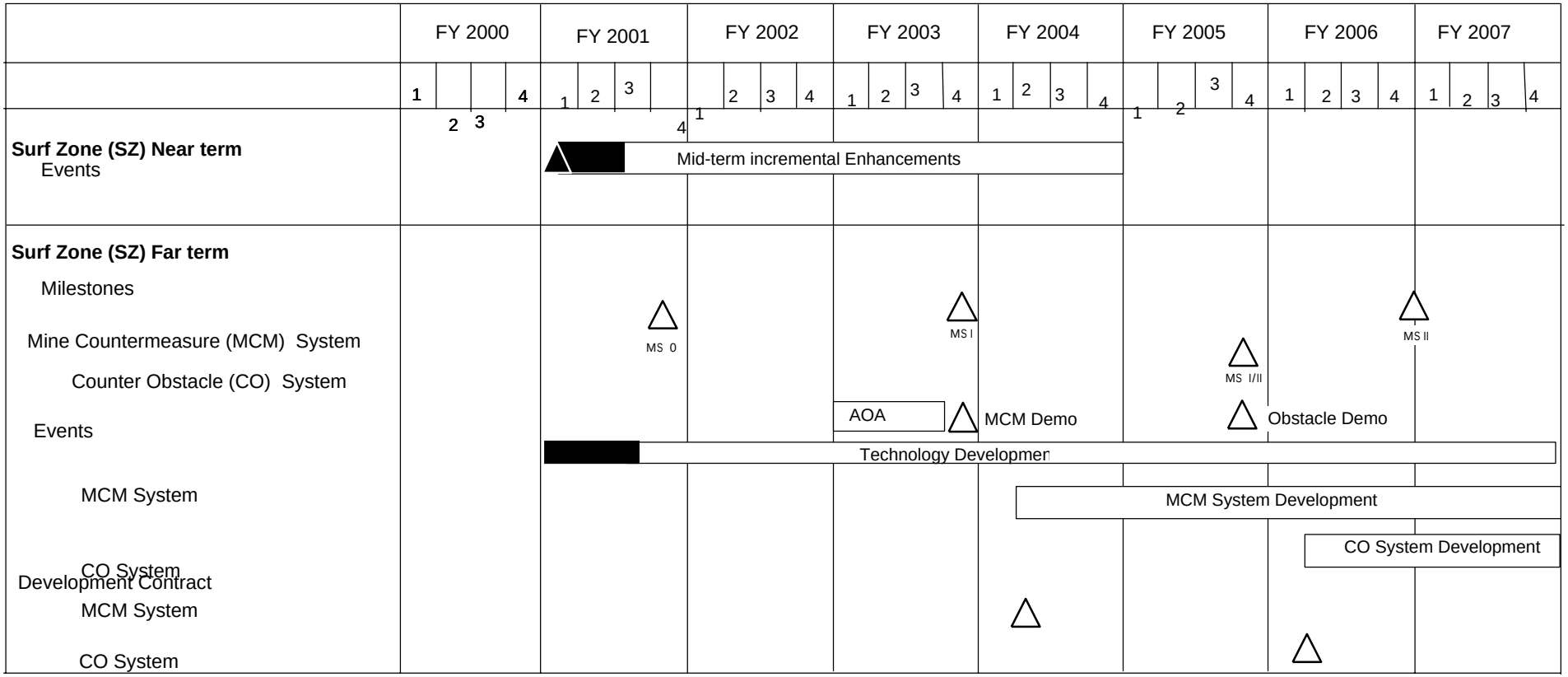

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 20001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Surface & Shallow Water MCM/0603502N**			PROJECT NAME AND NUMBER Assault Breaching Systems/Q2131						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	IH, CSS, TBD	49.100	3.305	11/99	2.149	11/00	0.400	11/01	CONT.	CONT.	N/A
Ancillary Hardware Development	WR	IH, CSS, TBD	8.100	0.000		0.000		0.000		0.000	8.100	N/A
Systems Engineering	WR	IH, CSS	15.000	0.000		0.640	11/00	0.300	11/01	CONT.	CONT.	N/A
Licenses	WR	N/A	0.800	0.000		0.000		0.000		0.000	0.800	N/A
Tooling	WR	IH, CSS, TBD	0.860	0.000		0.000		0.000		0.000	0.860	N/A
GFE	WR	IH, CSS	3.100	0.125	11/99	0.225	11/00	0.200	11/01	CONT.	CONT.	N/A
Award Fees	N/A	N/A	0.500	0.000		0.000		0.000		0.000	0.500	
Subtotal Product Development			77.460	3.430		3.014		0.900		CONT.	CONT.	
Remarks:												
Development Support Equipment	WR	IH, CSS, TBD	11.721	0.000		0.000		0.000		0.000	11.721	N/A
Software Development	WR	CSS	8.037	0.000		0.000		0.000		0.000	8.037	N/A
Training Development	WR	IH, CSS	2.000	0.000		0.000		0.000		0.000	2.000	N/A
Integrated Logistics Support	WR	IH, CSS	2.100	0.262	11/99	0.350	11/00	0.100	11/01	CONT.	CONT.	N/A
Configuration Management	WR	IH, CSS	3.400	0.149	11/99	0.195	11/00	0.050	11/01	CONT.	CONT.	N/A
Technical Data	WR	IH, CSS	2.300	0.025	11/99	0.263	11/00	0.050	11/01	CONT.	CONT.	N/A
GFE	WR	IH, CSS	0.400	0.000		0.000		0.000		0.000	0.400	N/A
Subtotal Support			29.958	0.436		0.808		0.200		CONT.	CONT.	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Surface & Shallow Water MCM/0603502N**			PROJECT NAME AND NUMBER Assault Breaching Systems/Q2131						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	IH, CSS, TBD	20.900	2.040		0.000		0.000	11/01	CONT.	CONT.	N/A
Operational Test & Evaluation	WR	IH, CSS, TBD	8.000	0.212	11/99	0.443	11/00	0.000	11/01	CONT.	CONT.	N/A
Tooling	WR	IH, CSS, TBD	0.700	0.000		0.000		0.000		0.000	0.700	N/A
GFE	WR	IH, CSS, TBD	0.400	0.000		0.000		0.000		0.000	0.400	N/A
Subtotal T&E			30.000	2.252		0.443		0.000		CONT.	CONT.	
Remarks:												
Contractor Engineering Support	WR	IH, CSS, TBD	2.200	0.079		0.000		0.000		0.000	2.279	N/A
Government Engineering Support	WR	IH, CSS	6.000	3.960	11/99	6.444	11/00	2.690	11/01	CONT.	CONT.	N/A
Program Management Support	WR	IH, CSS, NAVSEA	8.893	0.854	11/99	0.863	11/00	1.442	11/01	CONT.	CONT.	N/A
Travel	WR	NAVSEA	0.700	0.050	11/99	0.050	11/00	0.050	11/01	CONT.	CONT.	N/A
Labor (Research Personnel)	N/A	N/A									0.000	
Overhead	N/A	N/A									0.000	
Subtotal Management			17.793	4.943		7.357		4.182		CONT.	CONT.	
Remarks:												
Total Cost			155.211	11.061		11.622		5.282				
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**29.849**	**27.384**	**56.088**						**CONT.**	**CONT.**
V2094	**29.849**	**0.000**	**0.000**						**CONT.**	**CONT.**
Q2094	**0.000**	**27.384**	**56.088**						**CONT.**	**CONT.**
Quantity of RDT&E Articles						**1-LMRS**				

A. Mission Description and Budget Item Justification:

This project was completely restructured in FY 1994 in response to Congressional direction provided in the FY 1994 DOD Appropriations Act. Specifically, the office of the Secretary of Defense and the Navy were directed to (1) establish priorities among various proposed UUV programs, (2) focus on near-term mine countermeasures issues, and (3) establish affordable, cost-effective programs. The Navy developed an overall UUV Program Plan, which was approved by ASN(RD&A) June 1994, endorsed by USD(A&T) and forwarded to Congress to support FY 1995 budget deliberations.

The UUV Program Plan establishes a clandestine, near-term mine reconnaissance capability as the Navy's top UUV priority; a long term-mine reconnaissance system as priority two; the conduct of surveillance, intelligence and tactical oceanography missions as priority three; and exploring advanced UUV designs for the future as priority four. FY 1995 Congressional language complimented the Navy Plan and fully supported priorities one and two starting in FY 1995.

The UUV project funds development of the first three priorities of the UUV Program Plan. The Near-Term Mine Reconnaissance System (NMRS) is a minehunting UUV system launched and recovered from an SSN-688 class submarine capable of mine detection, classification, and localization. One NMRS Operational Prototype (OP) system was made available to the Commander Submarine Development Squadron-Five in FY 1999. No further production of the NMRS is planned. The AN/BLQ-11 Long-Term Mine Reconnaissance System (LMRS) is being developed to provide a robust, long-term Fleet capability to conduct clandestine minefield reconnaissance. A quantity of 6-12 LMRSs will be procured beginning in FY04. Eight LMRSs have been funded through POM 02. The Navy's third priority is the conduct of surveillance, intelligence and tactical oceanography. To meet this requirement the Navy will develop a Mission Reconfigurable UUV (MRUUV) system that is capable of performing different missions. It is envisioned that this system will use the same vehicle energy section and structure of the LMRS, but will have payload sensors appropriate to meet various mission requirements.

The Near-Term Mine Reconnaissance System (NMRS) program has developed and tested one operational prototype system. The NMRS was made available to the Fleet and will remain available for Fleet use until delivery of the first LMRS. In accordance with N87 letters Ser N87/9U657190 of 26 July 1999 and Ser N87/9U657196 of 27 July 1999, all remaining RDT&E funding for NMRS has been applied to the LMRS program. With the completion of the NMRS program, no further reference will be made to NMRS prior year funding in Exhibit R-3.

The Long-Term Mine Reconnaissance System (LMRS) is currently in development. The fabrication of a prototype system will begin in FY01. This prototype system will support test and evaluation, and will transition to fleet operations in FY03.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) (29.849) (LMRS): Awarded development contract to Boeing and began development phase. Completed STR and began Subsystem CDRs.

2. (U) FY 2001 PLAN:

(U) (26.701) (LMRS): Continued development phase and begin fabrication of prototype system. Complete Final System CDR.

(U) (.683) (LMRS): Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

(U) (45.100) (LMRS): Continue development phase and complete fabrication of prototype system.

(U) (4.395): MRUUV : Analysis Of Alternatives

(U) (4.395): L-PUMA: Engineering Studies/Analysis Of Alternatives

(U) (2.198): SAS: Prototype Design

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N

B. Other Program Funding Summary: ($ in Millions)

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
OPN PE 0204281N; Line Item 217100	0.000	0.000	0.000						CONT.	CONT.
O&MN PE 0204281N; 12B6 (LMRS)	0.000	0.000	0.000						CONT.	CONT.

C. Acquisition Strategy: One Operational Prototype NMRS has been procured via sole source contract. No further NMRS production is planned. The LMRS acquisition strategy is structured to maximize competition during system development. In FY97 three one year contracts were awarded for development of preliminary design. In early FY98, two of the preliminary design contractors were selected to continue development through a critical design review. Selection of these two contractors was based primarily on the contractor's performance during the preliminary design contract. In early FY00, Boeing was selected to complete the LMRS design, fabricate a prototype system and support in-water testing. Procurement of the LMRS will be sole source to Boeing. A competitive procurement is not cost effective due to the limited (6-12) number of systems planned for procurement.

The MRUUV project will conduct an AOA in FY02 and award an RDT&E contract for the development and prototyping of the system beginning in FY03. Procurement and operations not planned within the FYDP.

D. Schedule Profile: See next page.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, NAVY/BA-4	Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N	Unmanned undersea Vehicle V2094, Q2094

UUV PROGRAM SCHEDULE

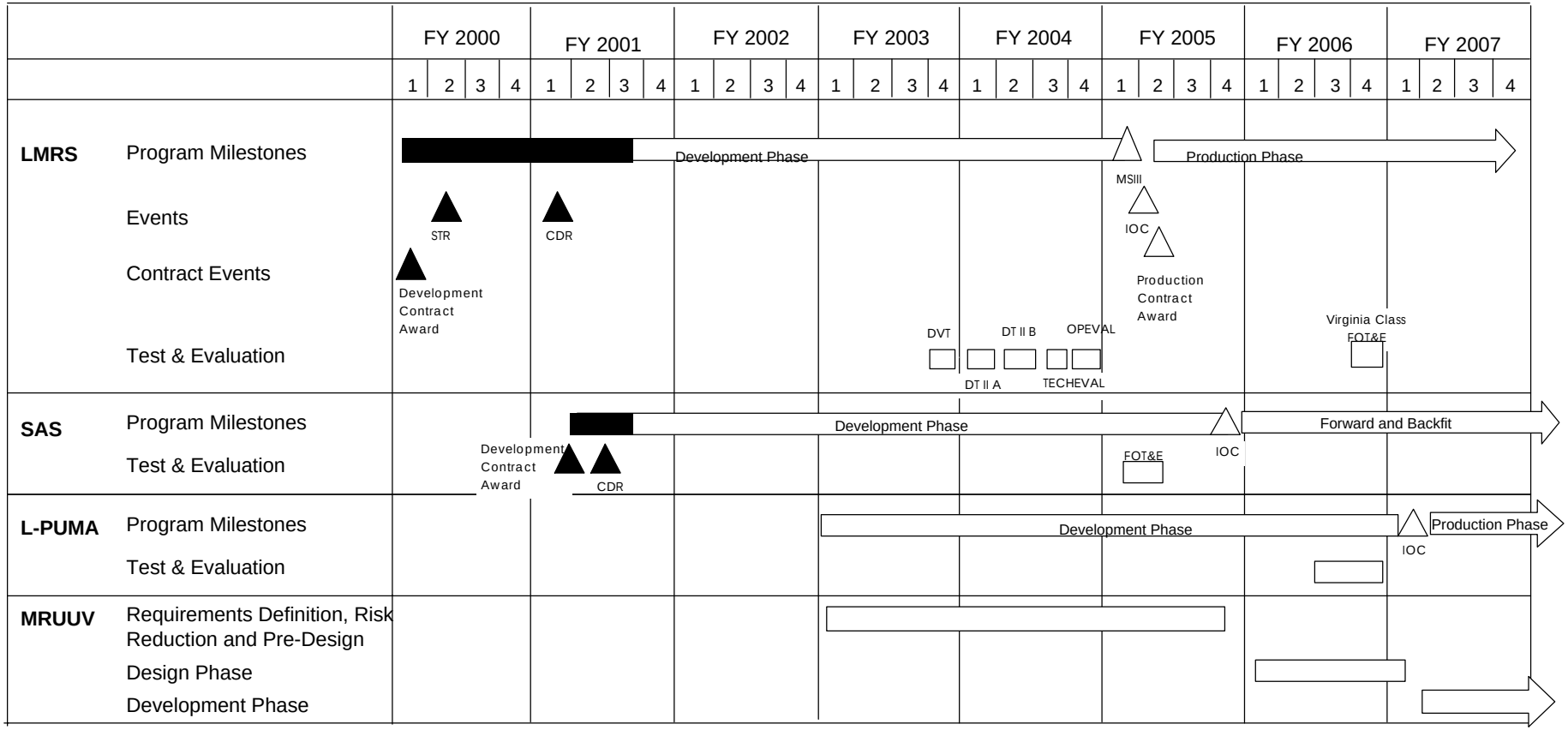

Exhibit R-3 Cost Analysis								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, NAVY/BA-4**		PROGRAM ELEMENT NAME AND NUMBER Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N						PROJECT NAME AND NUMBER Unmanned undersea Vehicle V2094, Q2094				
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development (LMRS) Design Contracts	FFP/ CPAF	NGC, Boeing and Lockheed Martin	29.984									30.825
Award Fees (LMRS Design)			0.841									
Primary Hardware Development (LMRS) Development Contract	CPAF/IF	Boeing		23.967		17.013	N/A	31.188	N/A	Cont	Cont	Cont
Award Fee (LMRS Development)				0.517		1.619		1.799		Cont	Cont	Cont
EAC Incentive Fee (LMRS Development)						0.300		0.600		Cont	Cont	Cont
AUPC Incentive Fee (LMRS Development)												
Engineering Services				0.164		0.236		0.100		Cont	Cont	Cont
MRUUV Development								4.000				
L-PUMA Development								4.000				
SAS Development								2.000				
UUV Center of Excellence						1.489						
GFE												
Subtotal Product Development			30.825	24.648		20.657		43.687		Cont	Cont	Cont
Development Support Equipment			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Software Development			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Training Development			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Integrated Logistics Support			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Configuration Management			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Technical Data			0.000	0.000		0.000		0.000		0.000	0.000	0.000
GFE			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	0.000

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, NAVY/BA-4**		PROGRAM ELEMENT NAME AND NUMBER Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N						PROJECT NAME AND NUMBER Unmanned undersea Vehicle V2094, Q2094				
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWC						1.398	10/01	Cont	Cont	Cont
Operational Test & Evaluation	WR	NUWC								Cont	Cont	Cont
GFE	WR	NUWC		0.032	10/99	0.007	10/00		10/01	Cont	Cont	Cont
Govt Facilities Cost (LMRS Develop)	WR	NUWC, NSWC	0.450	1.728		1.661		0.241		Cont	Cont	Cont
Subtotal T&E			0.450	1.760		1.668		1.639		Cont	Cont	Cont
Remarks:												
Contractor Engineering Support	FFP	JHU/APL, ARL/UT	3.469	0.000		0.075		0.550		Cont	Cont	Cont
Government Engineering Support	WR	NUWC, NSWC	7.406	2.873	10/99	3.086	10/00	4.525	10/01	Cont	Cont	Cont
Program Management Support	Various	RPI, Vred, Stanley, KPMG	2.448	0.323	10/99	0.610	10/00	0.539	10/01	Cont	Cont	Cont
		ONR				0.865		3.365		Cont	Cont	Cont
		Other	0.393	0.143	Various	0.260	Various	1.683	Various	Cont	Cont	Cont
Travel			0.114	0.102		0.163		0.100		Cont	Cont	Cont
Subtotal Management			13.830	3.441		5.059		10.762		Cont	Cont	Cont
Remarks:												
Total Cost			45.105	29.849		27.384		56.088		Cont	Cont	Cont
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4**					R-1 ITEM NOMENCLATURE Surface Ship Torpedo Defense / 0603506N - Subhead C4NZ					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**6.092**	**15.853**	**4.818**						**0.000**	**26.763**
Joint US/UK Surface Ship Torpedo Defense V2045	**3.888**	**0.000**	**0.000**						**0.000**	**3.888**
Surface Ship Torpedo Defense V0225*	**2.204**	**0.000**	**0.000**						**0.000**	**2.204**
Surface Ship Torpedo Defense F0225*	**0.000**	**15.853**	**4.818**						**0.000**	**20.671**

*Due to realignment to PEO Submarines FY 2001, funds will be allocated under Project Unit F0225 vice V0225.

A. Mission Description and Budget Line Justification: Project V2045 continues a joint collaborative program with the United Kingdom to develop future technologies identified during the recent Demonstration/Validation (D&V) phase of the program, such as the mobile expendable acoustic decoy, concept one countermeasures, improved torpedo detection classification and localization, and improved performance of the AN/SLQ-25A in shallow water/ littoral regions. Project V0225/F0225 develops Tripwire Torpedo Defense System (TTDS) which will provide additional sensors/processor integration with the AN/SLQ-25A and an Anti-Torpedo Torpedo (ATT) All-Up-Round (AUR) countermeasure.

B. Program Change Summary:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	4.640	0.000	4.800
(U) Appropriated Value:	4.640	16.000	4.800
(U) Adjustments to FY2000/2001 Appropriated Value/ FY 2001 President's Budget:	1.452	-0.147	0.018
(U) FY 2002 PRES Budget:	6.092	15.853	4.818

Funding: FY 2000: Across-the-Board Reduction (-$0.026), FY00 SBIR Load 6/00 (-$0.090), FY00 Midyear Review Adjustment (-$0.012), Proportionate Rate (-0.018), ONR BTR Update (+$1.600), FY 2000 Actuals (0.002)
FY 2001: .7% Pro-Rata Reduction (-$0.112), Congressional Plus Up (+$16.000) [Anti-Torpedo Torpedo All-Up-Round (+6.000)], Ship Towed Tripwire Sensor (+8.000), and Distributed Engineering Center (+2.000)], Goverment-Wide Recission (-$0.035)
FY 2002: Final POM02 Balance (-$0.006), Program Support (+$0.016), Inflation (+0.008)

Schedule: Not Applicable

Technical: Not Applicable

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Surface Ship Torpedo Defense, 0603506N**				PROJECT NAME AND NUMBER Surface Ship Torpedo Defense V0225/F0225					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**2.204**	**15.853**	**4.818**						**0.000**	**22.875**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: Project F0225 develops Tripwire Torpedo Defense System (TTDS) which will provide additional sensors/processor integration with the AN/SLQ-25A and an Anti-Torpedo Torpedo All-Up-Round (ATT AUR) countermeasure.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($ 0.604) Continued AN/SLQ-25A Winch and Tow Upgrade Efforts.
- (U) ($ 1.600) Developed ATT Warhead

2. (U) FY 2001 PLAN:
- (U) ($5.853) Continue Development of the ATT AUR
- (U) ($7.792) Initiate Development of Tripwire Sensors & TDCL processor for large Deck Ships and DDG Flight IIA Ships.
- (U) ($2.000) Develop Distributed Engineering Center for integrating shipbuilder and design agent's developmental efforts.
- (U) ($208) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
- (U) ($0.983) Continue Development of Tripwire Sensors and TDCL processor for large Deck Ships and DDG Flight IIA Ships.
- (U) ($3.835) Continue Development of ATT AUR for Surface Ships.

B. Other Program Funding Summary:

OPN BLI: 221300
Surface Ship Torpedo Defense - SSTD

FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
0	0	0	0	0	0	5.026	10.068	CONT.	CONT.

WPN BLI: 311300
Surface Ship Torpedo Defense - SSTD

FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
0	0	0	0	0	0	4.128	6.041	CONT.	CONT.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Surface Ship Torpedo Defense, 0603506N**	Surface Ship Torpedo Defense/V0225/F0225	

C. Acquisition Strategy: Not Applicable

D. Schedule Profile:

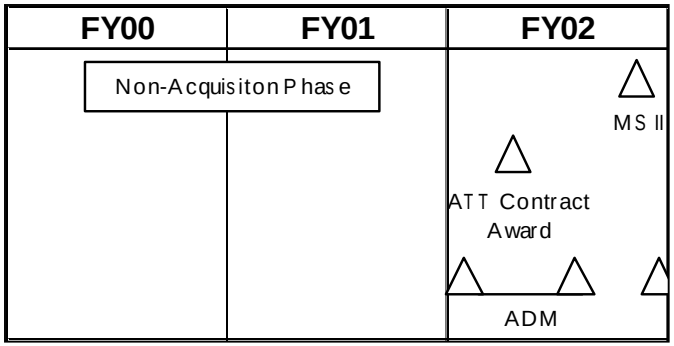

Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Surface Ship Torpedo Defense/0603506N**	Surface Ship Torpedo Defense/V0225/F0225

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF	FEL, Farmingdale, NJ	0.000	0.463	07/00	1.000	03/01	0.583	01/02	CONT.	CONT.	
Primary Hardware Development	CPFF	Unknown	0.000	0.000	N/A			3.135	01/02	CONT.	CONT.	
Ancillary Hardware Development	CPFF	AAC	0.000	0.260	07/00	6.000	03/01	0.400	01/02	CONT.	CONT.	
Systems Engineering	WR	NUWC, Newport, RI	0.000	0.025	11/99	0.725	03/01			CONT.	CONT.	
Systems Engineering	CPFF	PSU, State College, PA	0.000	0.210	01/00	4.600	03/01			CONT.	CONT.	
Systems Engineering	CPFF	JHU, Baltimore , MD	0.000	0.090	02/00	0.100				CONT.	CONT.	
Systems Engineering	WR	NSWC, Indian Head, MD	0.000	1.000	06/00	1.000	03/01			CONT.	CONT.	
Systems Engineering	WR	NUWC/Keyport,WA	0.000	0.030	08/00					CONT.	CONT.	
Systems Engineering	WR	NUWC/Newport, RI	0.000	0.020	09/00					CONT.	CONT.	
Systems Engineering	WR	FTSCLANT/Norfolk, VA	0.000			0.065				CONT.	CONT.	
GFE										CONT.	CONT.	
Award Fees										CONT.	CONT.	
Subtotal Product Development			0.000	2.098		13.490		4.118		CONT.	CONT.	

Remarks:

Development Support Equipment										CONT.	CONT.	
Software Development										CONT.	CONT.	
Training Development										CONT.	CONT.	
Integrated Logistics Support										CONT.	CONT.	
Configuration Management										CONT.	CONT.	
Technical Data										CONT.	CONT.	
GFE										CONT.	CONT.	
Miscellaneous			0.000	0.020		1.583				CONT.	CONT.	
Subtotal Support			0.000	0.020		1.583		0.000		CONT.	CONT.	

Remarks:

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4** | PROGRAM ELEMENT: **Surface Ship Torpedo Defense/0603506N** | PROJECT NAME AND NUMBER: Surface Ship Torpedo Defense/V0225/F0225

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation										CONT.	CONT.	
Operational Test & Evaluation										CONT.	CONT.	
Operational Test & Evaluation										CONT.	CONT.	
GFE										CONT.	CONT.	
Subtotal T&E			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Contractor Engineering Support										CONT.	CONT.	
Government Engineering Support										CONT.	CONT.	
Program Management Support				0.086		0.755		0.600		CONT.	CONT.	
Travel						0.025		0.100		CONT.	CONT.	
Labor (Research Personnel)										CONT.	CONT.	
Overhead										CONT.	CONT.	
Subtotal Management			0.000	0.086		0.780		0.700		CONT.	CONT.	
Remarks:												
Total Cost			0.000	2.204		15.853		4.818		CONT.	CONT.	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4**					R-1 ITEM NOMENCLATURE Carrier Systems Development - 0603512N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**134.194**	**149.549**	**165.150**						**Cont.**	**Cont.**
S1722 CV Weapons Elevator Improvements	**0.993**	**1.043**	**1.049**						**Cont.**	**Cont.**
42208 Future CV R & D	**104.240**	**123.378**	**124.469**						**Cont.**	**Cont.**
42693 Carrier Systems Definition	**23.815**	**14.230**	**33.435**						**Cont.**	**Cont.**
W1723 CV Launch & Recovery Systems	**1.338**	**6.731**	**5.346**						**Cont.**	**Cont.**
W2269 EAF Matting	**3.808**	**4.167**	**0.851**						**0.000**	**18.716**
Quantity of RDT&E Articles										

A. Mission Description and budget Item Justification This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

- (U) (S1722) -- Development of standardized, supportable and maintainable aircraft carrier weapons elevators components.

- (U) (42208) -- Development of ship hull, mechanical, propulsion, electrical, aviation and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, survivability, operational capabilities, and to meet the requirements of existing and pending regulations and statutes critical to the operation of existing and future aircraft carriers.

- (U) (42693) - Supports post Milestone I ship system technical definition and refinement of cost estimates through engineering efforts. These efforts will support ORD level requirements definition and assessments for industrial capability, risk, Integrated Logistics Support (ILS), schedule development and tracking to ensure a coordinated acquisition effort. Continue Total Ship Integration efforts to develop ship requirements and definition at the total systems level.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4**	R-1 ITEM NOMENCLATURE Carrier Systems Development - 0603512N

- (U) (W1723) -- Development of all systems required to provide approach and landing guidance and control, recovery, service, support and launch aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and fleet modernization.

- (U) (W2269) -- Development of Lightweight Mat and Expeditionary Arresting Gear for use at Marine Corps Expeditionary Airfields (EAF).

B. Program Change Summary

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	141.957	148.952	156.631
(U) Appropriated Value:	142.783	150.952	
(U) Adjustments to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:	-8.589	0.597	8.517
(U) FY 2002 PRES Budget Submit:	134.194	149.549	165.148

Funding:

FY00 change (-$8.859)
(-$3.215) SBIR reductions, (-$3.500) Naval Fires Network Transfer, (-$1.365) Congressional undistributed reductions, (-$0.417) program adjustments, and (-$.092) minor pricing adjustments.

FY01 change (+$0.597)
(+$2.000) ASW Tactical Decision Aids, (-$1.385) Congressional undistributed reductions, and (-$0.018) minor pricing adjustments.

FY02 change (+$8.517)
(-$9.300) moved from 42208 into PE 0604567N/42301 to support LFT&E requirements, (+$5.000) CVNX Class Technology, (+$20.300) CVNX1 Total Ship Integration, (-$7.688) moved from W1723 into PE 0604512N to reflect program as an Engineering and Manufacturing Development effort instead of a Demonstration and Validation effort, and (+$0.205) minor pricing adjustments.

Schedule: (U) W1723 -- The deferral of the VISUAL program Milestone II from 2Q FY00 to 3Q FY00 was due to delays in developing, coordinating, and finalizing program documentation. Final evaluation of the VISUAL "centerline camera" components was delayed in FY00 due to funding constraints associated with the award of the VISUAL electro-optic EDM contract.

Technical: Not applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**0.993**	**1.043**	**1.049**						**Cont.**	**Cont.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification

This project provides for advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevators components such as control systems, hoist machinery, doors and hatches. Emphasis is placed on the reduction of total ownership cost, improvement of safety, reliability, maintainability and watertight integrity and weight reduction.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACCOMPLISHMENTS:
(U)($.200) – Completed linear actuator tests.
(U)($.075) – Completed alternative governor research.
(U)($.072) – Completed platform landing load analysis.
(U)($.306) – Developed intelligent controls for multiple car systems.
(U)($.340) – Completed linear drive ropeless elevator research.

FY 2001 PLAN:
(U)($.233) – Complete design for model ropeless elevator safety system.
(U)($.200) – Develop simulation model for multiple cars in non-traditional trunk.
(U)($.160) – Investigate feasibility of available smart sensor networks for condition sensing.
(U)($.100) – Test magnetostrictive actuator for use on elevator closure systems.
(U)($.150) - Develop intelligent networked controls for existing elevator systems.
(U)($.100) - Complete alternate overspeed governor tests.
(U)($.100) - Investigate use of embedded force sensing pins.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Future Carrier R&D - S1722	

FY 2002 PLAN:

(U)($.200) – Develop design for non-traditional trunk installation at LBES.
(U)($.179) – Develop electrical power simulation model for linear electric drive.
(U)($.200) – Test one-tenth scale model to validate design model and safety feature concepts.
(U)($.200) – Test one tenth scale model to validate electrical power model.
(U)($.100) – Test wireless sensor for effectiveness on LBES elevator platforms.
(U)($.170) – Develop PC based control for linear electric drives in multiple car systems.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**	PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722	

B. Other Program Funding Summary: Not applicable

C. Acquisition Strategy: Not applicable

D. Schedule Profile	FY 2000	FY 2001	FY 2002
Program Milestones	2Q Completed Alternative governor research 4Q Completed linear drive ropeless elevator research	3Q Complete design for ropeless elevator	4Q Develop PC based control for linear electric drives in multiple car systems
Engineering Milestones	3Q Developed intelligent multiple car controls	4Q Develop simulation model for multiple cars 2Q Investigate feasibility of available SMART sensor networks for condition sensing. 4Q Develop intelligent networked controls for existing elevator systems 4Q Investigate embedded force sensing pins	4Q Develop design for non-traditional trunk at LBES 2Q Develop electrical power simulation model for linear electric drive
T&E Milestones	4Q Completed linear actuator tests	4Q Test magnetostrictive actuator for use on elevator closures 2Q Complete alternate governor testing	3Q Test scale model to validate design model & safety features 4Q Test scale model to validate electrical power model 2Q Test wireless sensor for effectiveness on LBES
Contract Milestones			

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**			PROGRAM ELEMENT **Carrier Systems Development - 0603512N**			PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Philadelphia	0.540	0.678	12/99	0.850	12/00	0.549	12/01	Cont.	Cont.	Cont.
Ancillary Hardware Development		Misc	0.821									
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			1.361	0.678		0.850		0.549		Cont.	Cont.	Cont.
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**		PROGRAM ELEMENT **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Philadelphia	0.210	0.315	12/99	0.193	12/00	0.500	12/01	Cont.	Cont.	Cont.
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.210	0.315		0.193		0.500		Cont.	Cont.	Cont.
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			1.571	0.993		1.043		1.049		Cont.	Cont.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER Future Carrier R&D - 42208					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**104.240**	**123.378**	**124.469**						**Cont.**	**Cont.**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification

This project provides for the development of aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers and the potential realization of subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACCOMPLISHMENTS:

-(U) ($43.888)-Non-Nuclear Propulsion Plant Development

- (U) ($15.404) Began preliminary design of the main propulsion unit (MPU). Completed preliminary main turbine generator (MTG) design, developed testing requirements and identified required testing capabilities for a prototype unit. Produced MTG schematic diagrams identifying all ship and system connections.

- (U) ($5.619) Integrated Non-Propulsion equipment into the Steam and Electric Equipment layouts. Determined major system requirements and performance criteria and provided information for the integrated product model. Established non-propulsion systems interface requirements with propulsion plant and power distribution systems.

- (U) ($6.782) Continued developing enhancements to the product data management software and prototype automated workflow for construction deliverables. Developed design analysis features required for propulsion plan design development.

- (U) ($16.083) Began developing conceptual designs for optimized mechanical and electrical systems that interface with the propulsion plant. Established interface controls between propulsion and non-propulsion equipment. Developed optimal volume and weight requirements for these mechanical and electrical systems. Established layout of doors, ladders, passageways, hatches, and escape trunks integrated with the optimal propulsion plant.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Future Carrier R&D - 42208

- (U) ($31.659) –Aircraft Launch, Recovery & Support - Electromagnetic Aircraft Launch System (EMALS) (formerly Advanced Tehcnology Launcher) Program Definition and Risk Reduction Phase. Awarded two competitive contracts for full size, full power, fully integrated, reduced length prototype launcher systems. Initiated system engineering, technology assessment and risk mitigation efforts. Completed Systems Requirements Review, trade studies, and initial Preliminary Design Review for both contracts. Completed baseline ship system designs and initiated sub-scale test bed development and critical component testing. Developed initial ship integration plans for CVNX-1/CVNX-2 and identified preliminary hull, mechanical and electrical support requirements. Provided management, system engineering, and ship integration support.

- (U) ($4.423) – Battle Damage Prevention & Recovery - Initiated signatures support and integration in battle damage prevention efforts. This includes acoustic and non-acoustic signatures reduction design support efforts addressing performance, cost and ship impacts assessment. Continued evaluation and development of Upgraded Armor Protection System - Littoral (UAPS - Littoral), Dynamic Armor Protection System (DAPS), Underwater Protection System (UWPS), and Weapons Damage and Residual Strength design concepts to meet threats and design goals. Developed preliminary system designs and determined installation feasibility within ship concept designs. Developed plans for procurement and development of scaled test components. Prepared test facilities for small scale testing. Commenced refinement of analytical capabilities for underwater protection systems, to include the Torpedo/Mine Side Protection System (T/MSPS). Defined design, producibility and material property goals for General Protective Plate. Commenced fire vulnerability study in support of initiatives targeted at improving preformance, and reducing operation and support costs of related systems. Commenced development of enhanced damage control and firefighting concepts.

- (U) ($1.340) – Manpower and Material Support – Initiated development of manpower and material support alternatives to achieve manpower reductions and total ownership cost savings. Included will be the development of advanced robotics for ship systems and components operation, maintenance and material handling in the areas of combat and intelligence, logistics and Hull Mechanical & Electrical (HM&E). A standardized open system architecture approach will be incorporated into system and component development.

- (U) ($19.678) - Combat and Intelligence Systems – Completed Phase II competitive solicitation for Combat Systems Integration concepts and design process. Continued monitoring improvements targeted at reducing the operational and support costs of the ship's war fighting systems. Initiatives remain focused on reducing the number of systems through the use of "multi-function" radars and flat planar antenna arrays, data exchange across operational areas, data fusion, and integrated displays for operators. Completed trade studies, including those that result in cost reductions without degrading operational performance into the design development. Evaluated and completed competitive Combat Systems Integration design development and integrated into the ship contract data package. Commenced Phase III Design Refinement. Refined Combat Systems Integration design and integrated into the ship design.

- (U) ($3.252) – Systems Development– Supported CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also supported the Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provided acquisition planning support.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**	PROJECT NAME AND NUMBER Future Carrier R&D - 42208

FY 2001 PLAN:

- (U) ($50.411) Non-Nuclear Propulsion Plant Development

- (U) ($18.003) Begin detailed design of the main turbine generator (MTG) prototype, development of MTG prototype testing requirements and plans. Continue preliminary design of the main propulsion unit.

- (U) ($6.226) Determine changes to and complete layout of major electric plant equipment such as load centers outside of propulsion plant spaces. Continue development of inputs to the integrated product model database. Refine interface requirements for the non-propulsion systems with the propulsion and power distribution systems.

- (U) ($7.785) Continue prototyping and implementation of automated workflow for construction deliverables. Continue to integrate analysis and other required function into the product model design and continue adding design data to the database.

- (U) ($18.397) Complete preliminary designs and continue development of mechanical and electrical systems that interface with the propulsion plant. Finalize overall layout of non-propulsion plant mechanical and electrical systems and assess preliminary volume and weight data.

- (U) ($43.738) – Aircraft Launch, Recovery & Support – Continue Electromagnetic Aircraft Launch System Program Definition and Risk Reduction (PDRR) phase. Initiate prototype system long-lead time material procurements. Conduct component and subsystem development testing. Conduct incremental Preliminary and Contract Design Reviews. Begin PDRR system manufacture and integration. Continue CVNX-1/CVNX-2 arrangement studies, system integration and support requirements development. Develop hull, mechanical and electrical system requirements. Provide management, system engineering, and ship integration support for all aviation related systems.

- (U) ($4.668) – Battle Damage Prevention & Recovery - Continue battle prevention and ship survivability ship design assessments with limited small scale testing and analyses for UWPS, Weapons Damage and Residual Strength and T/MSPS protection systems. Commence design of DAPS components and small scale testing of DAPS concepts. Commence Live Fire Test & Evaluation efforts to support development of documentation required for MS II approval, including commencing of surrogate testing.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Future Carrier R&D - 42208

- (U) ($12.052) – Systems Development– Commence total ship design integration. Commence design, engineering and interoperability analyses to support overall CVNX Design Development. Perform TOC reductions/analyses, survivability analyses, systems readiness reviews gap analyses, Advanced Launch & Recovery analyses, trade studies and Lethality Studies. Continue development of manpower and material support alternatives which will achieve manpower reductions and total ownership cost savings. Perform acquisition planning, system readiness reviews (SRR), and documentation to support MS II.

- (U) ($7.560) - Smart Carrier - The Smart Carrier Program is a PEO Carriers' initiative involving the introduction of information technology, automation and controls, and process improvements with the goal of reducing total workload, lowering total ownership (TOC), and enhancing quality of life. The following technologies will be actively installed on a demonstration basis: Advanced Damage Control, Remote Shaft Alley Monitoring, Integrated Condition Assessment System, Rechargeable Battle Lanterns, Battery-powered Tools and Bulkhead Surface Coating.

- (U) ($1.938) - ASW Tactical Decision Aids - Integrate tactical decision aid technology from the Advanced Undersea Warfare Concept into future aircraft carrier combat systems, an initial step in fulfilling a larger vision of Network - Centric Undersea Warfare Theater Combat System. Develop a prototype system in the aircraft carrier tactical Support Center Integrated Warfare Commander Cell.

- (U) ($3.011) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2002 PLAN:

-(U) ($55.799) Non-Nuclear Propulsion Plant Development

-(U) ($26.500) Begin fabrication of prototype MTG and complete detailed design. Complete preliminary design of the main propulsion unit. Continue development of testing requirements and the identification and evaluation of testing capabilities.

-(U) ($8.900) Continue development of inputs to the integrated product model.

-(U) ($6.149) Continue prototyping and implementation of automated workflow for construction deliverables. Continue to integrate analysis and other required functions into product model design.

-(U) ($14.250) Continue development of mechanical and electrical systems that interface with the propulsion plant.

- (U) ($4.900) - Commence development of the Large Capacity Reverse Osmosis Desalination Plant based on system design requirements developed by non-nuclear propulsion plant efforts.

- (U) ($47.683) – Aircraft Launch, Recovery & Support – Continue Electromagnetic Aircraft Launch System Program definition and Risk Reduction phase. Complete prototype test facility design and construction. Complete manufacture, integration and acceptance testing of prototype launch systems. Begin installation of prototype systems in test facilities. Initiate CVNX-1 integration development. Provide management, system engineering, and ship integration support for all aviation related systems.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Future Carrier R&D - 42208

- (U) ($5.000) – Battle Damage Prevention & Recovery - Continue battle damage prevention and recovery assessments and design improvements development. Continue acoustic and non-acoustic signatures design support efforts. Expand modeling and simulation and scaled testing efforts for advanced protection systems development to address Underwater Protection, Weapons Damage and Residual Strength and Dynamic Armor Protection system that are applicable to Nimitz modified and new configuration hull forms. Continue and expand advanced damage control systems and improved magazines/shipboard fire protection systems technologies development.

- (U) ($5.000) - CVNX Class Technologies - Commence development of long term technology features for integration into the CVNX Class ship design to fulfill operational requirements and to meet ship construction schedule . Items for which initial technology investment will be made include survivability features such as dynamic armor protection and development of items to address deficiencies in service life allowance for weight and stability requirements (KG).

- (U) ($4.087) - Systems Development - Continue total ship design integration. Commence design, engineering and interoperability analyses to support overall CVNX Design Development. Perform TOC reductions/analyses, survivability analyses, systems readiness reviews gap analyses, Advanced Launch & Recovery analyses, trade studies and Lethality Studies. Continue development of manpower and material support alternatives which will achieve manpower reductions and total ownership cost savings. Provide acquisition planning support.

- (U) ($2.000) - Smart Carrier - The Smart Carrier Program is a PEO Carriers' initiative involving the introduction of technology insertions and process improvements with the goal of reducing total workload, lowering total ownership cost (TOC). Continue research, evaluation and integration of new technologies and process engineering efforts in support of potential workload reductions. New technologies to be evaluated and/or demonstrated are listed, but not limited to the following: Autonomous Launch Bar Seating Check, In-Line Fuel Sampling and Single Cost-Coat Systems for Tank & Void Preservation.

B. Other Program Funding Summary

Related RDT&E:		FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Complete	Total Cost
0604567N/42301 CV Contract Design											
	CVN-77	33.806	45.887	35.457						0	115.15
	CVNX	0	0	9.324						Cont.	Cont.
0603570N/S2692	Advance Nuclear Power System										
		68.418	98.302	106.101						449.989	722.810
Related SCN:											
200100 Carrier Replacement Program		747.503	4038.105	147.890						Cont.	Cont.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Future Carrier R&D - 42208

C. Acquisition Strategy. The Carrier acquisition strategy for CVNX will utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Electro-Magnetic Aircraft Launching System (EMALS) on CVNX-1 and improvements in the area of aviation, survivability, service life restoration and Total Ownership Costs (TOC) reduction on the CVNX-2. On each hull, core capabilities will be maintained and TOC will be reduced in accordance with Carrier goals. As with previous NIMITZ class carriers, the CVN77 was awarded as a sole source Fixed Price Incentive Fee (FPIF) contract to Newport News Shipbuilding. For CVNX-1 and future hulls, early IPPD design efforts will be cost type contracts with construction contracts anticipated to be FPIF similar to CVN 77.

D. Schedule Profile:	FY 2000	FY 2001	FY 2002
Program Milestones	CVNX: 2Q MS1		CVNX: 3Q MS2
Engineering Milestones	EMALS: 2Q SRR EMALS: 4Q PDR	EMALS: 3Q CDR	EMALS: 4Q Initiate Sys Instl @ LKE
T&E Milestones			
Contract Milestones	EMALS: 1Q PDRR Phase		

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA 4** | PROGRAM ELEMENT: **Carrier Systems Development - 0603512N** | PROJECT NAME AND NUMBER: Future Carrier R&D - 42208

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development												
Aircraft Launch, Recovery & Support	CPAF	Northrop Gumman		13.727	12/99	16.513	N/A	23.263	11/01	Cont.	Cont.	Cont.
	CPAF	General Atomics		14.000	12/99	16.513	N/A	18.700	11/01	Cont.	Cont.	Cont.
	WR	NAWC Lakehurst, NJ	2.711	3.219	11/99	3.120	11/00	2.920	11/01	Cont.	Cont.	Cont.
	CPAF	NNS, Va			11/99	2.270	11/00	2.000	11/01	Cont.	Cont.	Cont.
		Miscellaneous				4.122						
Battle Damage & Recovery	WR	NSWC/CD, MD	1.000	2.831	11/99	3.408	12/00	0.750	11/01	Cont.	Cont.	Cont.
	WR	APG, MD		0.000	N/A	0.000	11/00	3.250	11/01	Cont.	Cont.	Cont.
	CPAF	NNS, Va		1.592	11/99	0.680	03/01	0.500	11/01	Cont.	Cont.	Cont.
	Various	Miscellaneous	1.511	0.000	N/A	0.580	11/00	0.500	11/01	Cont.	Cont.	Cont.
Propulsion Plant Development	SS,CPFP	BETTIS, PA	27.739	43.888	11/99	0.000	N/A			0.000	71.627	71.627
	C	NNS, Va				48.399	11/00	53.567	11/01	57.200	159.166	159.166
	Various	Miscellaneous	2.299	0.000	N/A	2.012	11/00	2.232				
Reverse Osmosis Desalination Plant	CPAF	NNS, Va						4.400	11/01	Cont.	Cont.	Cont.
	Various	Miscellaneous						0.500	11/01			
Manpower & Material Support	WR	NSWC/CD, MD		0.320	11/99						0.320	0.320
	Various	Miscellaneous	2.298	0.220	11/99						2.518	2.518
	C	Boeing, CA		0.800	11/99						0.800	0.800
Systems Development	CPAF	NNS, Va				4.906						
	WR	NSWC/CD, MD				3.528	12/00	3.325	11/01	Cont.	Cont.	
	Various	Miscellaneous		3.252	11/99	3.243		0.587				
Combat & Intelligence Systems	C	NNS, Va		9.261	11/99	0.000	N/A			Cont.	Cont.	Cont.
		Bath Iron Works		10.417	01/00	0.000	N/A			Cont.	Cont.	Cont.
ASW Tactical Decision Aids		Progeny, VA				1.500	03/01					
		NUWC KP				0.272						
	Various	Miscellaneous				0.166						
Smart Carrier	C	NNS, Va				0.205	12/00			Cont.	Cont.	Cont.
	Various	Miscellaneous				6.814	11/00	1.259	11/01	Cont.	Cont.	Cont.
CVNX Class Technologies	Various	Miscellaneous						5.000	11/01			
SBIR		Miscellaneous				3.011						
Subtotal Product Development			37.558	103.527		121.262		122.753		Cont.	Cont.	Cont.
Remarks:												
Development Support Equipment											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)											DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**			PROGRAM ELEMENT **Carrier Systems Development - 0603512N**			PROJECT NAME AND NUMBER Future Carrier R&D - 42208						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Aircraft Launch, Recovery & Support	CPAF	Miscellaneous		0.713	11/99	1.200	11/00	0.800	11/01	Cont.	Cont.	Cont.
Operational Test & Evaluation												
Aircraft Launch, Recovery & Support												
Subtotal T&E			0.000	0.713		1.200		0.800		Cont.	Cont.	Cont.
Remarks:												
Contractor Engineering Support												
Aircraft Launch, Recovery & Support												
Program Management Support	CSS	TBD			11/99					Cont.	Cont.	Cont.
Systems Development	TBD					0.100	11/00	0.100	11/01			
Smart Carrier	TBD					0.541	11/00	0.541	11/01			
Travel						0.275	11/00	0.275	11//01			
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.916		0.916		Cont.	Cont.	Cont.
Remarks:												
Total Cost			37.558	104.240		123.378		124.469		Cont.	Cont.	Cont.
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER Carrier Systems Definition - 42693					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**23.815**	**14.230**	**33.435**						**Cont.**	**Cont.**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: This project performs the Ship Feasibility Studies required after Milestone 0 (MS 0) to address a specific Mission Needs Statement (MNS) and support the Analysis of Alternatives (AOA) for the Future Carrier (CVNX) Program; performs impact studies of aircraft/air wing composition, propulsion, hull alternatives, combat systems, machinery and electrical subsystems, and cost on CVNX designs, supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal character and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACOMPLISHMENTS:

- (U) ($12.505) Conducted ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Developed an Integrated Master Plan. Developed the Test and Evaluation Master Plan. Developed logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Developed cost model and baseline cost estimates.

- (U) ($11.310) Conducted engineering efforts associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Conducted trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further developed Integrated Product Process Development (IPPD).

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Carrier Systems Definition -- 42693

FY 2001 PLAN:

- (U) ($0.855) Continue to conduct ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Continue to develop an Integrated Master Plan and the Test and Evaluation Master Plan. Continue development of logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Continue to develop cost model and baseline cost estimate.

- (U) ($12.999) Continue to conduct engineering effort associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Continue trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further develop IPPD.

- (U) ($0.376) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2002 PLAN:

-(U) ($33.435) Continue to conduct engineering effort associated with the CVNX Ship Development phase. Continue ship design definition to meet ORD Key Performance Parameters such as Service Life Allowance and Sortie Generation Rate. Conduct Total Ship Integration of the design changes required to the legacy baseline design to develop ship requirements and definition at the total system level. Further develop IPPD in support of Milestone II.

B. Other Program Funding Summary

Related RDT&E:		FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Complete	Total Cost
0604567N/42301 CV Contract Design											
	CVN-77	33.806	45.887	35.457							115.15
	CVNX	0	0	9.324							Cont.
0603570N/S2692	Advance Nuclear Power System										
		68.418	98.302	106.101							272.821
Related SCN:											
200100 Carrier Replacement Program		747.503	4038.105	147.890							Cont.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	Carrier Systems Definition - 42693	

C. Acquisition Strategy: The Carrier acquisition strategy for CVNX will utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Electro-Magnetic Aircraft Launching System (EMALS) on CVNX-1 and improvements in the area of aviation, survivability, service life restoration and Total Ownership Costs (TOC) reduction on the CVNX-2. On each hull, core capabilities will be maintained and TOC will be reduced in accordance with Carrier goals. As with previous NIMITZ class carriers, the CVN77 was awarded as a sole source Fixed Price Incentive Fee (FPIF) contract to Newport News Shipbuilding. For CVNX-1 and future hulls, early IPPD design efforts will be cost type contracts with construction contracts anticipated to be FPIF similar to CVN 77.

D. Schedule Profile:	FY 2000	FY 2001	FY 2002
Program Milestones	CVNX: 2Q MS1		CVNX: 3Q MS2
Engineering Milestones	EMALS: 2Q SRR EMALS: 4Q PDR	EMALS: 3Q CDR	EMALS: 4Q Sys Instll @ LKE
T&E Milestones			
Contract Milestones	EMALS: 1Q PDRR Phase		

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA 4** | PROGRAM ELEMENT: **Carrier Systems Development - 0603512N** | PROJECT NAME AND NUMBER: Carrier Systems Definition - 42693

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development	SS, CPFF	BETTIS, PA	35.372	0.000	N/A						35.372	35.372
		AME, VA	6.851	0.000							6.851	6.851
	C, CPFF	JJMA, VA	6.200	0.000							6.200	6.200
	C, CPFF	NSWC/CD, MD	3.000	2.083	11/99			2.300	11/01		7.383	7.383
	WR	NSWC/DD, VA	1.500	0.170	11/99						1.670	1.670
	WR	Miscellaneous	11.127	1.202	11/99			2.325	11/01		14.654	14.654
	Various	Miscellaneous	1.311	2.690	11/99	0.855	11/00	3.335	11/01		8.191	8.191
	C	NNS		16.530	11/99	12.999	10/00	20.675	11/01		50.204	50.204
	WR	NAWC Lakehurst, NJ		1.140							1.140	1.140
	FP	Anteon, VA						4.800	11/01		4.800	4.800
SBIR		SBIR				0.376					0.376	
Subtotal Product Development			65.361	23.815		14.230		33.435			136.841	136.841

Remarks:

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**		PROGRAM ELEMENT **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER Carrier Systems Definition - 42693						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			65.361	23.815		14.230		33.435		0.000	136.841	136.841
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**1.338**	**6.731**	**5.344**						**Cont.**	**Cont.**
RDT&E Articles Qty			**2**							

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the developmentof systems providing approach and landing guidance, recovery, service, support, and launch of aircraft operating on or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, and increased aircraft service life. Specific programs include:

-(U) Virtual Imaging System for Approach and Landing (VISUAL): VISUAL will provide the Landing Signal Officer (LSO) and other command personnel with enhanced images of the aircraft and ship in low visibility and night conditions during launch and recovery operations.

- (U) Constant Run-Out Valve (CROV): The CROV developmenteffort will replace the existing control and retract valves on the MK7 arresting gear, providing enhanced performance and restoring margins of safety. This program addresses the CV(N) OAG's Number 11 priority item (arresting gear improvements).

- (U) Advanced Arresting Gear Engine (AAGE): The AAGE replaces the MK7 arresting gear engine, which has reached the limits of its operating capability. This program represents the long term solution to the CV(N) OAG's Number 11 priority item (arresting gear improvements).

- (U) Cost Reduction Effective Improvement Initiative (CREI) Arresting Gear Fairlead Sheaves: This program seeks to replace the unique hydraulic fluid used on the arresting gear system sheaves with a more durable product that will have a longer service life thus decreasing system life cycle costs.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it develops and integrates hardware for experimentaltests related to specific ship or aircraft application.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACCOMPLISHMENTS:
(U) ($ .300) DevelopedCROV acquisition strategy, performance specification, milestone and contracting documentation, and source selection criteria. Developed performance requirements and Statement of Objectives and released CROV RFP.

(U) ($ 1.038) Released VISUAL electro-opticalsensor and display EDM phase solicitation. Reviewed responses and selected VISUAL electro-opticalsensor and display EDM contractor. Received Milestone II decision to proceed to the EMD phase. Provided engineering and management support to the program, particularly for the transition from the PD&RR phase to the EMD phase of the program.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N	**Carrier Systems Development - 0603512N**	CV Launch & Recovery Systems - W1723

2. FY 2001 PLANS

- (U) ($2.870) Conduct CROV proposal review and select EDM contractor. Award contract for design, analysis, computer simulation, and prototype manufacture of two (2) CROV and control systems test articles. Conduct Preliminary Design Review (PDR) and perform initial test planning and test facility modifications.

- (U) ($3.363) Develop AAGE system specification. Solicit industry participation and evaluate potential technologies capable of achieving system objectives. Prepare solicitation and milestone docmentation. Release Request for Proposals. Provide engineering and management support to the program. **

- (U) ($0.342) Complete evaluation of VISUAL "centerline camera" sensor candidates. Conduct laboratory evaluations and select sensor configuration for incorporation in VISUAL EMD program. Select best candidates for installation of prototype system in CVN flight deck and evaluate under controlled operational conditions.

- (U) ($0.156) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2002 PLAN:

- (U) ($5.346) Conduct CROV Critical Design Review (CDR) and deliver two (2) EMD test articles and initiate developmental testing.

**Continued funding for this program was transferred to Program Element 604512N, Project Unit W2232.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**	PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723

B. Other Program Funding Summary:
N/A

Related RDT&E

P.E. 0602122N (Aircraft Technology)
P.E. 0604512N (Shipboard Aviation Systems)

C. Acquisition Strategy:
VISUAL: The Navy is conducting system integration and risk reduction efforts at NAWCADLKE, including sensor and subsystem development and integration. Based on these efforts, a full system performance specification will be prepared and a cost plus award fee EDM contract will be competitively awarded.

CROV: The Navy is preparing a performance specification and will competitively award up to two cost plus award fee contracts to develop prototypes for evaluation at the NAWCADLKE Runway Arrested Landing Site.

Schedule Profile:	FY 2000	FY 2001	FY 2002	TO COMPLETE
Program Milestones	VISUAL: 3Q 00 MS II			
Engineering Milestones		CROV: 3Q 01 PDR AAGE: 3Q 01 System Spec	CROV: 2Q 02 CDR	CREI: 1Q/03 Design Prototype CREI: 2Q/03 CDR
T&E Milestones			CROV: 2Q-4Q 02 DT	CREI: 2Q-3Q/03 DT CROV: 1Q/03 DT
Contract Milestones	VISUAL: 3Q 00 EDM Awd CROV: 4Q 00 RFP	CROV: 2Q 01 EDM Award AAGE: 3Q 01 RFP		

Exhibit R-3 Cost Analysis (page 1)											DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**		PROGRAM ELEMENT **Carrier Systems Development - 0603512N**			PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WX	NAWCAD, LKE	20.829	1.338	11/99	1.720	11/00			Cont.	Cont.	
CROV Primary Hardware Dev.	TBD	TBD				1.150	02/01	0.450	11/01		1.600	1.600
AAGE Systems Engineering	WX	NAWCADLKE				3.363	11/00			Cont.	Cont.	
VISUAL Design, Manufacturing	C/FP	FIIR Systems			11/99	0.342	01/01				0.342	0.342
Subtotal Product Development			20.829	1.338		6.575		0.450		Cont.	Cont.	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N** | PROGRAM ELEMENT: **Carrier Systems Development - 0603512N** | PROJECT NAME AND NUMBER: CV Launch & Recovery Systems - W1723

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
CROV Developmental/Reliability testi	WX	NAWCAD, Lakehurst						4.894	11/01		4.894	
Subtotal T&E			0.000	0.000		0.000		4.894		0.000	Cont.	
Remarks:												
SBIR Assessment						0.156						
Subtotal Management			0.000	0.000		0.156		0.000		0.000	Cont.	
Remarks:												
Total Cost			20.829	1.338		6.731		5.346		Cont.	Cont.	Cont.
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Carrier Systems Development - 0603512N**				PROJECT NAME AND NUMBER EAF Matting W2269					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**3.808**	**4.167**	**0.851**						**0.000**	**18.716**
RDT&E Articles Qty	**2**									

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Program Definition and Risk Reduction (PDRR) phase of the lightweight airfield mat and expeditionary arresting gear to meet naval aviation unique Expeditionary Airfield (EAF) operational requirements, including transportability requirements on Maritime Prepositioning Ships (MPS).

(U) The currently deployed EAF mat (AM-2) was developed for heavy fighter (such as the F-4) operations and is cumbersome to deploy. Lightweight (1/2 the weight of AM-2), less voluminous (1/2 the volume of AM-2), and easier to install (five days vice fifteen days to install a complete airfield) mat material may be technically feasible and commercially available, but must be evaluated for use with current type/model/series naval and Air Mobility Command (AMC) aircraft at conventional and Vertical and Short Take-off and Landing (V/STOL) airfields ashore. Candidate mat materials under consideration include reinforced synthetic composite materials and polyvinyl fiberglass. These mat materials will be configured and evaluated under Marine Corps operational scenarios.

(U) The expeditionary arresting gear program will provide the Marine Corps with the capability to conduct short span arrestments of designated Navy and Marine Corps tail hook equipped aircraft in the expeditionary environment. The current arresting gear (M-21) cannot be adapted to operate on short span (100 feet or less) surfaces and is incapable of arresting the current inventory under casualty (no flaps or half flap) conditions. The M-21 has inadequate reliability and several replacement components are no longer produced. The replacement gear, M-31, will provide air transportability, rapid setup, full inventory operational compatibility under all arrestment conditions, and adequate operational reliability. Two M-31 prototype systems will be built under this project.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft application.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACCOMPLISHMENTS:

(U) ($3.808) Completed fabrication of two prototype M-31 systems and initiated performance testing with deadloads.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	EAF Matting W2269	

FY 2001 PLANS:
(U) ($4.122) Complete M-31 performance testing with deadloads. Initiate developmental testing (DT). Demonstrate compatibility and performance thresholds with aircraft. Provide engineering and management support to the program.

(U) ($0.045) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2002 PLANS:
(U) ($ .851) Provide engineering and management support to the program. Complete developmental testing (DT) and achieve Milestone III.

B. Other Program Funding Summary

EAF OPN (PE 0206139M)

FY 2000	FY 2001	FY 2002	To Comp.
0.062	3.247	7.551	Cont.

Related RDT&E: N/A

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	**Carrier Systems Development - 0603512N**	EAF Matting W2269

C. Acquisition Strategy: The advanced lightweight mat acquisition strategy envisions the solicitation of candidate material panels from commercial sources for evaluation in the laboratory and in the operational environment. Upon qualification of a viable material, limited production quantities will be procured for full scale environmental, performance, and operational testing. Production quantities will be procured from the commercial source in accordance with Marine Corps prioritie

The M-31 arresting gear acquisition strategy is predicated on the creation of a fully integrated team consisting of Navy and contractor personnel. Initial technology development and system design effort will be shared between the partners. The commercial partner will take the lead in the prototype manufacturing effort; the Navy partner will lead the test effort; and the commercial partner will ultimately be tasked with system production.

D. Schedule Profile	FY 2000	FY 2001	FY 2002
Program Milestones			MS III 2Q 02
Engineering Milestones	Arresting Gear 2 Proto 4Q 00		
T&E Milestones		Arresting Gear DT 1Q-4Q 01	Final DT 1Q 02
Contract Milestones			

Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA 4**

PROGRAM ELEMENT: **Carrier Systems Development - 0603512N**

PROJECT NAME AND NUMBER: EAF Matting W2269

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPAF	ESCO	4.955	2.826	06/98	1.340	06/98	0.519	06/98		9.640	9.961
Ancillary Hardware Development	WX	NAWCAD LKE	4.935	0.982	10/99						5.917	
Award Fees	CPAF	ESCO						0.045			0.045	
Non-Add BTR for M-31 A/G												
Subtotal Product Development			9.890	3.808		1.340		0.564		0.000	15.602	

Remarks: None

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: None

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N / BA 4** | PROGRAM ELEMENT: **Carrier Systems Development - 0603512N** | PROJECT NAME AND NUMBER: EAF Matting W2269

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX	NAWCAD, Lakehurst				2.782		0.287			3.069	
Subtotal T&E			0.000	0.000		2.782		0.287		0.000	3.069	

Remarks: N/A

SBIR Assessment						0.045					0.045	
Subtotal Management			0.000	0.000		0.045		0.000		0.000	0.045	

Remarks: N/A

Total Cost			9.890	3.808		4.167		0.851		0.000	18.716	

Remarks: N/A

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	**108.548**	**256.065**	**288.382**							
DC/Survivability/32465	**(1) 0.000**	**(1) 0.000**	**(2) 5.036**							
AGS-Advanced Gun System/32467	**27.357**	**101.020**	**140.285**							
Undersea Warfare (USW)/32468	**13.200**	**21.040**	**25.541**							
Open Systems Architecture (OSA)[3]/32469	**23.508**	**21.906**	**(4) 5.606**							
Integrated Topside Design (ITD)/32470	**15.052**	**14.941**	**(5) 5.396**							
Integrated Power Systems (IPS)/32471	**24.561**	**90.222**	**106.518**							
Man Overboard Indicator/32729	**2.913**	**0.000**	**0.000**							
Ship Survivability & Personnel Protection/32730	**0.978**	**0.000**	**0.000**							
Advanced Water Jet Technology/S2751	**0.979**	**0.000**	**0.000**							
MTTC/IPI/32858	**0.000**	**6.936**	**0.000**							
Quantity of RDT&E Articles	**0**	**0**	**0**							

Notes: (1) (U) In FY 2000 and 2001, funding for this project is contained in PE 0604300N, SC-21 Total Ship Systems Engineering.
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed to this project from Project 32469 in FY 2002 and out.
(3) Project formerly known as Consolidated Hull, Mechanical, and Electrical (HM&E).
(4) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed from this project to Project 32465 in FY 2002 and out.
(5) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to PE 0604300N, Project 32464 in FY 2002 and out.

* (U) For explanation of Test Articles see Project 32467.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N

A. (U) Mission DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) was modified in FY 2000 and out to focus on DD 21 associated systems development. Specific DD 21 associated systems development efforts that were realigned under this PE include: the Advanced Gun Systems; Undersea Warfare; Integrated Topside Design; and Integrated Power Systems. In addition, a number of HM&E development tasks were incorporated into a consolidated HM&E Project (32469) focused on DD 21. In FY 00, DD 21 was provided Congressional funding for Man Overboard Indicator, Ship Survivability & Personnel Protection, and Advanced Water Jet Technology. Man Overboard Indicator funds were used to test and evaluate devices that improve the safety of flight and helicopter deck personnel. Ship Survivability & Personnel Protection funds were used for the evaluation of commercial off-the-shelf, non-developmental items(COTS/NDI) for personnel protection and survivability equipment and technologies including personnel locators and NDI devices to facilitate improved casualty response. Advanced Water Jet (AWJ) Technology funds were used to validate the performance of AWJ-21 using hydronumeric modeling and simulation design tools and small scale physical model tests. In FY 2001, PEO (S) was provided funding to perform Manufacturing Technology (MANTECH) studies at the McConnel Technology Transition Center, operated by Innovative Productivity, Inc. (MTTC/IPI). The funds will be used to establish the National Surface Treatment Center which will collect and disseminate surface coating systems application and performance data, qualify surface coating systems for military applications, and develop new coating systems.

(U) In FY 2002 and out, DD 21 design and systems integration elements of Consolidated HM&E (Project 32469) and Integrated Topside Design (Project 32470) were reprogrammed to PE 0604300N, Project 32464. Also in FY 2002 and out, ship survivability and auxiliary system elements of Project 32469 were moved to Project 32465, and Project 32465 was reprogrammed to this PE. This PE focuses on the development of shipboard system components for the DD 21 Class of U. S. Navy surface combatants. The mission of the DD 21 class is to provide affordable and credible independent forward presence/deterrence and operate as an integral part of Naval, Joint, or Combined Maritime Forces. DD 21 will provide advanced land attack capability in support of the ground campaign and contribute to Naval, Joint, or Combined battlespace dominance in littoral operations. It will establish and maintain surface and sub-surface superiority, provide local air defense, and incorporate signature reduction to operate in all threat environments. DD 21 will have seamless Joint Interoperability to integrate all source information for battlespace awareness and weapons direction.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	113.474	244.437	317.176
(U) Appropriated Value:	113.334	258.437	
(U) Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:	-4.926	11.628	-28.794
(U) FY 2002 PRES Budget Submit:	108.548	256.065	288.382

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N

(U) Funding:
The FY 2000 net decrease of $4.926M is due to Small Business Innovative Research (SBIR) reductions (-$2.421M); a Below Threshold Reprogramming (-$1.600M); realignment of funds to PE 0604300N to fund VSR shortfall (-$2.108M); Congressional Rescission (-$0.445M); and miscellaneous adjustments ($1.648M). The FY 2001 net increase of $11.628M is due to Congressional increases for Permanent Magnet Motor (+$7.000M) and McConnel Technology Transfer Center (+$7.000M), Economic Assumption Reduction (-$1.810M); and Congressional Rescission (-$0.562M). The FY 2002 net decrease of $28.794M is due to program element/project funding realignments within the DD21 program (-$29.461M), NWCF rate adjustments (-$0.391M), Non-pay Inflation adjustments-PBD604 (+$.478M) and miscellaneous minor reductions (+$.580M).

(U) Schedule: See individual projects

(U) Technical Parameters: Technical parameters are contained in the DD 21 Operational Requirements Document (ORD) approved by JROC on 16 October 1997.

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER DC/Survivability/32465					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**(1) 0.000**	**(1) 0.000**	**(2) 5.036**							
RDT&E Articles Qty	**0**	**0**	**0**							

Notes: (1) (U) In FY 2000 and 2001, funding for this project is contained in PE 0604300N, SC-21 Total Ship Systems Engineering, Project 32465.
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed to this project from Consolidated HM&E (Project 32469) in FY 2002 and out.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project funds development of DD 21 applicable and future surface combatant survivability and damage control (DC)/ firefighting systems and features that reduce vulnerability against weapons (e.g., missiles, mines, torpedoes) and enable effective recovery of mission capability under reduced manning conditions. Additionally, this project supports development of systems that reduce susceptibility to magnetic and acoustic influence mines. The requirements for this project are based on the need to develop affordable, balanced survivability designs that address recent wartime lessons learned and emerging and future threats.

(U) System development areas include: 1) automated degaussing control system that maintains a reduced, constant electromagnetic signature level for an extended deployment and provides on-board, real-time, tactical information on safe operating areas; 2) underwater shock and acoustic main machinery isolation systems that use rafting and semi-active mounts to provide increased survivability while operating in littoral environments; 3) ship design modeling and simulation program that predicts the vulnerability and recoverability response time of the ship, systems, and crew to primary and secondary weapons effects 4) damage tolerant structures that increase hull girder survival against close-in underwater explosions; 5) advanced damage control (DC) and auxiliary system architectures and control methods that enable continued system operation after damage through automated pre and post hit isolation and reconfiguration actions; 6) personnel protection devices that reduce stress and increase performance; and 7) portable firefighting devices that provide for remote operation with a minimally manned fire party.

1. (U) FY 2000 ACCOMPLISHMENTS
- Budgeted in PE 0604300N, Project 32465.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	DC/Survivability/32465

2. (U) FY 2001 PLAN
- Budgeted in PE 0604300N, Project 32465.

3. (U) FY 2002 PLAN
- (U) ($ 0.858) Continue development of survivable, medium voltage, electrical system architectures/components that enable uninterrupted damage control operations and continued combat capability after damage. Develop hardware and software requirements for a fault-clearing device that rapidly isolates the damaged portion of the system preserving power to the surviving electrical components. Prepare software development plan and initiate control logic coding.
- (U) ($ 0.658) Initiate development of survivable control methods and networks for distributed fluid systems (e.g. firemain) that enable automated, reliable isolation and reconfiguration following damage. Initiate evaluation of the survivability of alternative commercial control methods, including component level control, programmable logic controllers, and centralized processing.
- (U) ($ 0.615) Initiate development of machinery isolation systems (structural support raft and shock/acoustic mounts) that enable continued operation after close-in underwater explosion and provide for acoustic quieting. Develop an advanced shock and acoustic mount concept that provides significant shock protection and characterize response.
- (U) ($ 1.450) Continue demonstration of real-time, closed loop degaussing control system aboard USS Higgins, DDG 76. Deperm the USS Higgins and recalibrate the system for maintaining a low magnetic signature. Monitor stability of control algorithm/ system and conduct ranging. (This is a transition of effort from Project 32469, Consolidated HM&E.) Initiate development of a real-time tactical decision aid that provides safe operating areas as a function of the mine threat; prepare software development plan.
- (U) ($ 0.965) Continue development of the ship survivability design modeling and simulation program, Advanced Survivability Assessment Program (ASAP). Complete development of DC/ crew casualty and electrical models. (This is a transition of effort from Project 32469, Consolidated HM&E.) Initiate development of verification and validation (V&V) plan in accordance with applicable guidance. Prepare configuration management and product improvement plans.
- (U) ($0 .490) Close-out the composite pump development contract.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER DC/Survivability/32465	

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	DC/Survivability/32465	

D. (U) SCHEDULE PROFILE:

FY 2000	FY 2001	FY 2002
See PE 0604300N Exhibits	See PE 0604300N Exhibits	4Q - Survivable Electrical Power Software Development Plan 4Q- Shock and Acouctic Mount 3Q- Closed Loop Degaussing Ranging 4Q- ASAP DC and Electrical Models

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	DC/Survivability/32465

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering												
Product Development												
	WR	NSWC CD Bethesda, MD						4.400	11/01	CONT.	CONT.	
	Various	Other Contractors						0.486	Various	CONT.	CONT.	
Subtotal Product Development								4.886		CONT.	CONT.	

Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support								0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER DC/Survivability/32465						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E								0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	Various	Various Gov't Activities						0.150	11/01	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management								0.150		CONT.	CONT.	
Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.												
Total Cost								5.036		CONT.	CONT.	
Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.												

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER AGS-Advanced Gun System/32467					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**27.357**	**101.020**	**140.285**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: These funds provide for the development of the Advanced Gun System (AGS) associated with the development of DD 21. The AGS will consist of a major caliber gun, an automated ammunition handling system, and a family of munitions/propelling charges. The AGS will, at a minimum, meet the Land Attack and Surface Dominance Missions assigned to the gun system. The system will provide a high rate of fire (approximately 12 rounds per minute) with a magazine capacity sufficient in size for meeting USMC operational requirements. Land based testing of EDM hardware components to verify system design will commence in FY 2003.

1. (U) FY 2000 ACCOMPLISHMENTS
- (U) ($13.826) Initiated AGS Sub-system design phase.
- (U) ($4.005) Completed AGS munitions concepts; developed performance and interface specifications.
- (U) ($1.600) Developed EDM test fixture.
- (U) ($7.926) Developed Validation and Verification (V&V) tools for AGS.

2. (U) FY 2001 PLAN
- (U) ($60.502) Complete AGS Sub-system design phase.
- (U) ($16.288) Initiate Risk Reduction Phase for AGS munitions; conduct Industry competition based on performance specification.
- (U) ($5.141) Continue EDM text fixture development.
- (U) ($16.500) Continue with the development of V&V tools for AGS and AGS munitions.
- (U) ($2.589) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	AGS-Advanced Gun System/32467	

3. (U) FY 2002 PLAN:
- (U) ($27.235) Initiate AGS System design.
- (U) ($58.362) Commence EDM fabrication for Gun, magazine, and Control system.
- (U) ($34.237) Complete Risk Reduction Phase for AGS Long Range Land Attack Projectile (LRLAP).
- (U) ($17.751) Validate and verify the suitability and effectiveness of V&V tools for AGS and AGS munitions.
- (U) ($ 2.700) Continue EDM test fixture development.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

(U) The Navy conducted a comparison of concepts for the DD 21 Advanced Gun System, the results of which were reported to Congress by SECNAV on 10/99. The Advanced Gun System will be acquired in conjunction with the DD 21 development schedule. Initial phases will be conducted under section 845/804 other transaction authority. Initial phases include: Phase I – Concept Formulation, Phase II - Initial Prototype Development, Phase III - Subsystem Testing and Validation.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER AGS-Advanced Gun System/32467

D. (U) SCHEDULE PROFILE:

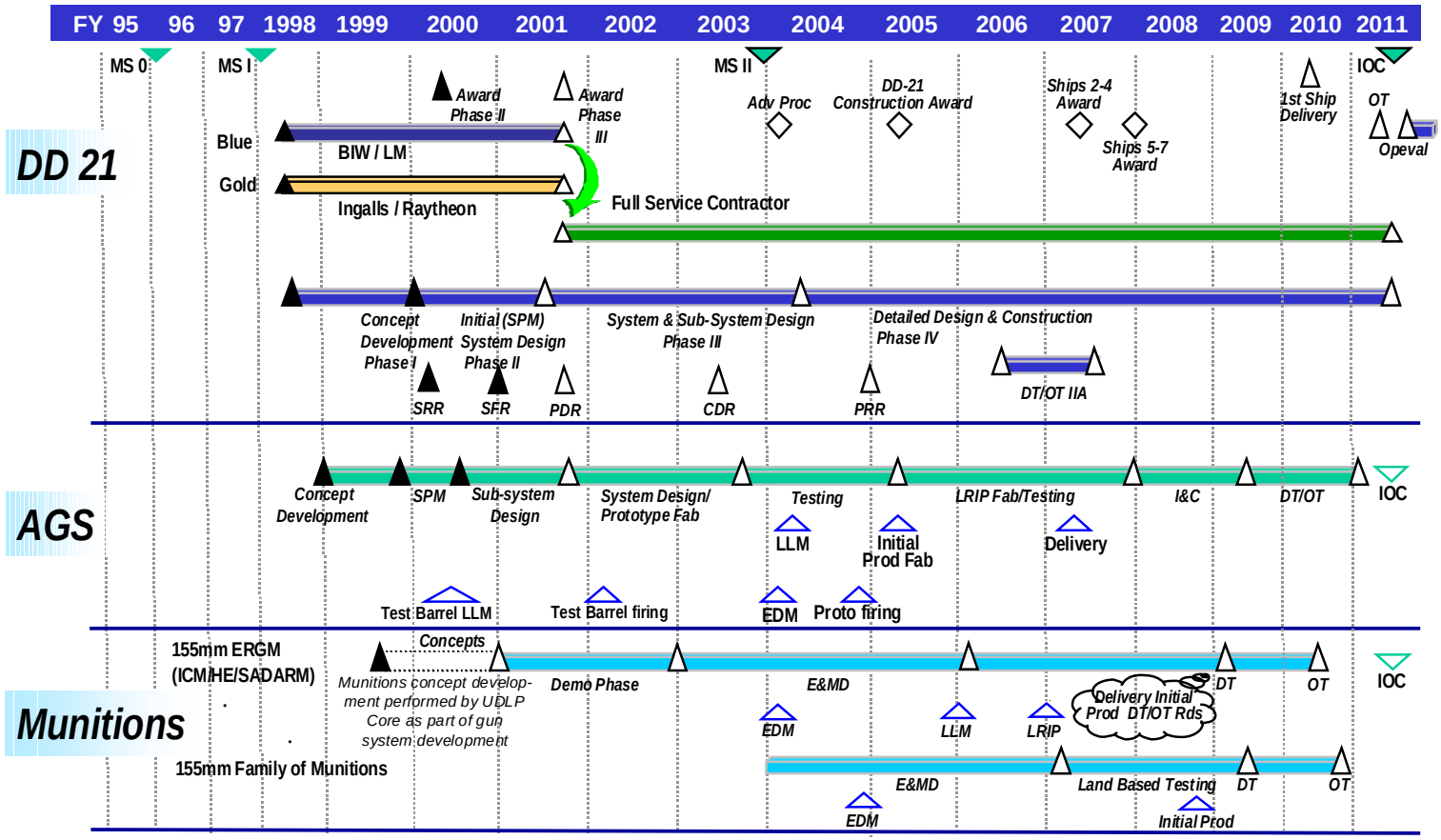

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			**Shipboard Sys Comp Dev/0603513N**			AGS-Advanced Gun System/32467						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Sec845/804	DD 21 Industry Teams	12.000	22.866	10/99	71.739	10/00	0.000	N/A	0.000	106.605	N/A
	CPIF	DD 21 FSC	0.000	0.000	N/A	25.000	06/01	137.615	11/01	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			12.000	22.866		96.739		137.615		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)									DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER AGS-Advanced Gun System/32467						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: (U) No developmental or operational evaluation is scheduled during this period.												
Contractor Engineering Support												
Government Engineering Support	WR	NSWC DD Dahlgren, VA	0.908	2.660	12/99	2.102	11/00	0.800	11/01	CONT.	CONT.	CONT.
	WR	NSWC PHD Pt Hueneme, CA	0.475	1.189	12/99	1.154	11/00	1.150	11/01	CONT.	CONT.	CONT.
	WR	Other Gov't activities	1.642	0.642	Various	1.025	Various	0.720	Various	CONT.	CONT.	CONT.
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			3.025	4.491		4.281		2.670		CONT.	CONT.	
Remarks:												
Total Cost			15.025	27.357		101.020		140.285		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**13.200**	**21.040**	**25.541**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Undersea Warfare (USW) project provides advanced development demonstration and validation of technology through a build-test-build process for potential surface sonar and combat system application. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond threat with emphasis on shallow water/littoral area USW and on Demonstration and Validation (DEM/VAL) of DD 21 Integrated Undersea Warfare (IUSW-21) Advanced Development Model (ADM). Key technology areas being investigated include: improvements in signal processing, advanced information processing, and multi-sensor data fusion to improve target detection and classification performance and reduce system manning requirements; and towed array, hull array and transducer technology to improve multi-static operation and in-stride mine avoidance. FY 2001 and subsequent efforts will focus on major technological and performance thrusts for DD 21 USW, which will define surface combatant USW capability for the Navy in the next century. These efforts will continue beyond DD 21 and provide improvements that apply across surface ship USW platform

1. (U) FY 2000 ACCOMPLISHMENTS
- (U) ($6.467) DD 21 Industry Teams - Began DD 21 USW initial system design. Participated in IUSW peer group and evaluated USW technologies.
- (U) ($3.857) IUSW-21 BAA risk reduction contracts/tasks - Exercised FY00 option of Broad Agency Announcements (BAAs) awarded in FY99 to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, and displays for reduced manning.
- (U) ($2.876) IUSW-21 ADM Development - Performed Integrated Peer Group (IPG) engineering reviews of IUSW-21 advanced technologies. Performed IUSW-21 ADM system engineering in preparation for FY02 at sea demonstration. Developed draft interface specifications and draft demonstration plan.

2. (U) FY 2001 PLAN
- (U) ($3.182) DD 21 Industry Teams - Continue DD 21 USW system design. Participate in IUSW peer group and evaluate USW technologies. Prepare for FY 02 At-Sea test.

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468	

2. (U) FY 2001 PLAN (CONTINUED):

- (U) ($4.168) IUSW-21 BAA risk reduction contracts/tasks - Exercise FY01 option of BAAs awarded in FY99 and other risk reduction efforts to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning. Start integration of BAAs into the ADM for the FY02 at sea demonstration.
- (U) ($11.349) IUSW 21 ADM Development - Perform IPG engineering reviews of IUSW-21 advanced technologies. Begin development and integration of IUSW-21 advanced technologies into ADM demonstration system. Finalize ADM interface specifications and sea test demonstration plan.
- (U) ($1.824) FY02 Sea Test - Conduct installation planning and develop TEMPALT. Prepare equipment, buy hardware and integrate Multi-Function Towed Array (MFTA) into ADM.
- (U) ($0.517) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN

- (U) ($5.037) DD 21 Industry Teams - Continue IUSW System Design. Participate in At-Sea test.
- (U) ($4.137) IUSW-21 Risk reduction contracts/tasks - Finish integration of FY99 BAAs into the ADM. Award new BAA contracts to support the build-test-build process and the FY04 sea test. BAAs will further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning.
- (U) ($14.342) IUSW-21 ADM Development - Perform IPG engineering reviews of IUSW-21 advanced technologies. Finish the development and integration of IUSW-21 advanced technologies into ADM demonstration system for FY02 sea test. Begin development of IUSW-21 advanced technologies for the FY04 sea test.
- (U) ($2.025) FY02 Sea Test - Finish equipment preparation. Ship and install equipment. Conduct Test. Collect data and begin data analysis

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468	

C. (U) ACQUISITION STRATEGY:

(U) In Contracting Phase I and II, DD 21 used Section 845/804 agreement authority for the efforts conducted by the DD 21 Industry Teams. BAAs will be competitively awarded to further refine advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning to provide further risk mitigation for DD 21 USW activities. In Contract Phase III responsibility for IUSW-21 ADM development for the FY04 and FY05 sea tests will be with the DD 21 Full Service Contractor (FSC).

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468

D. (U) SCHEDULE PROFILE:

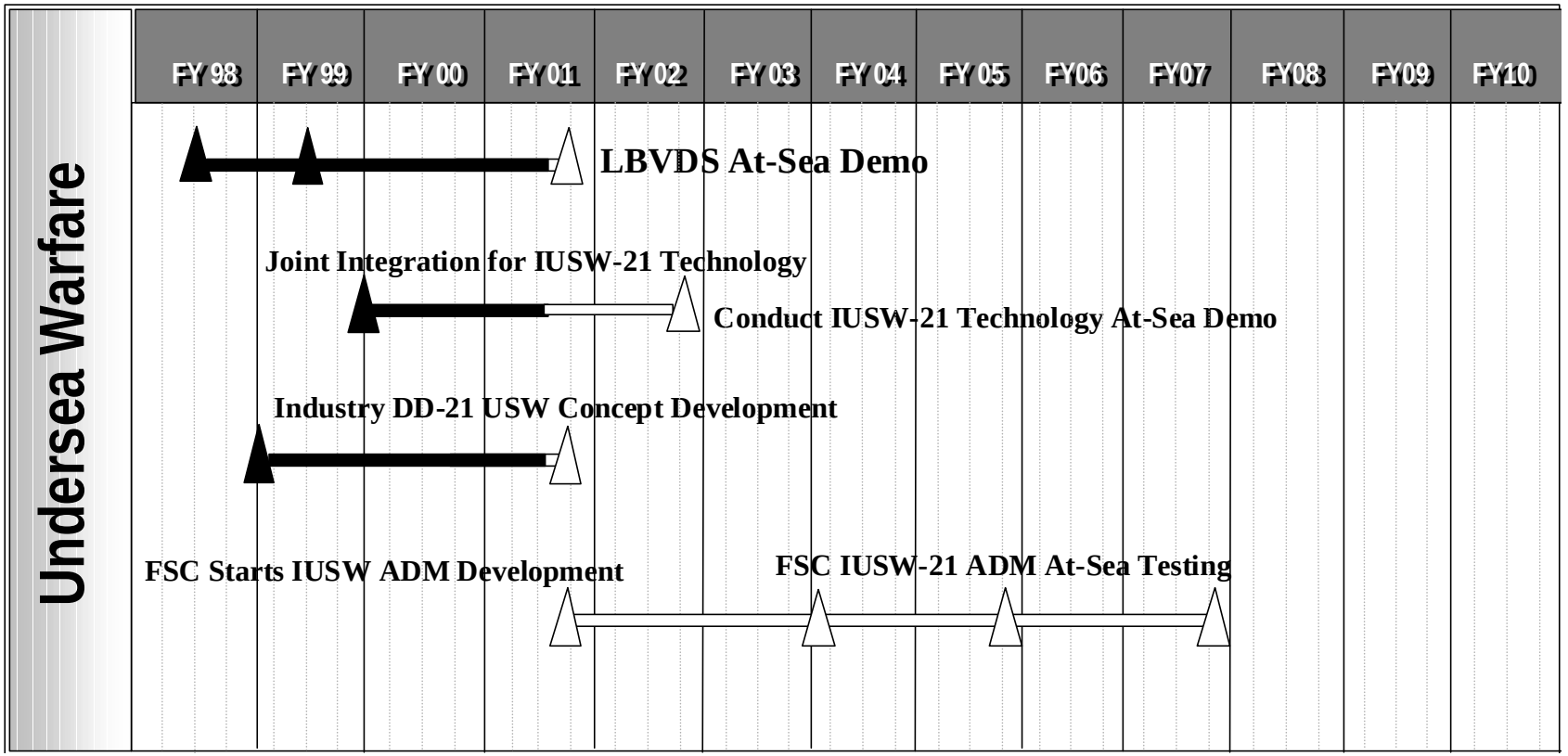

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Sec845/804	DD 21 Industry Teams	2.000	6.467	11/99	3.699	10/00	0.000	N/A	0.000	12.166	
	CPIF	DD 21 FSC	0.000	0.000	N/A	0.000	04/01	5.037	11/01	CONT.	CONT.	
	BAA/CPFF	Competition	6.944	3.857	Various	4.168	Various	4.137	Various	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering	C/CPFF	LMC, Syracuse, NY	0.000	0.813	Various	0.000	N/A	0.000	N/A	0.000	0.813	
(ADM Development)	C/CPFF	RSC, Newport, RI	0.000	0.827	Various	0.000	N/A	0.000	N/A	1.000	0.827	
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			8.944	11.964		7.867		9.174		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development	C/CPFF	LMC, Syracuse, NY	0.000	0.000	N/A	5.000	11/00	6.350	11/01	CONT.	CONT.	
(ADM Development)	C/CPFF	RSC, Newport, RI	0.000	0.000	N/A	4.954	11/00	6.350	11/01	CONT.	CONT.	
Training Development												
Integrated Logistics Support												
Configuration Management												
Engineering Support	WR	NUWC/N Newport, RI	1.550	0.528	12/99	0.500	11/00	0.500	11/01	CONT.	CONT.	
(ADM Development)	WR	NSWC DD Dahlgren, VA	0.275	0.075	12/99	0.075	11/00	0.075	11/01	CONT.	CONT.	
	WR	NSWC/CSS, Panama City	0.000	0.000	N/A	0.040	11/00	0.040	11/01	CONT.	CONT.	
	SS/CPFF	APL/JHU Laurel, MD	0.562	0.126	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	APL/UW Seattle, WA	0.150	0.100	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	ARL/UT Austin., TX	0.150	0.150	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	ARL/PSU State Col, PA	0.150	0.066	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
GFE												
Subtotal Support			2.837	1.045		11.169		13.915		CONT.	CONT.	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWC/N Newport, RI	0.000	0.000	N/A	0.824	11/00	2.025	11/01	CONT.	CONT.	
	C/CPFF	Competition	0.000	0.000	N/A	1.000	11/00	0.000	N/A	0.000	1.000	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		1.824		2.025		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	GSA	Anteon Arlington, VA	0.231	0.100	12/99	0.100	11/00	0.100	11/01	CONT.	CONT.	
Miscellaneous	PD/WR	Various	0.000	0.091	Various	0.080	Various	0.327	Various	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.231	0.191		0.180		0.427		CONT.	CONT.	
Remarks:												
Total Cost			12.012	13.200		21.040		25.541		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Open Systems Architecture (OSA)[1] /32469					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**23.508**	**21.906**	**(2) 5.606**							
RDT&E Articles Qty	**0**	**0**	**0**							

Notes: (1) Project formerly known as Consolidated Hull Mechanical and Electrical (HM&E)
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to the DD 21 Design line (PE 0604300N, Project 32464) beginning in FY 2002. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed from this project to the DC/Survivability line (PE 0603513N, Project 32465) beginning in FY 2002.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: In FY 2000 and 2001, this project supports the advanced development of DD 21 HM&E ship survivability, auxiliary machinery, Affordability Through Commonality (ATC) technologies, and systems that will enable DD 21 survivability, manning, and life cycle cost goals to be met. This project also supports several fleet-focused research and development efforts. Beginning in FY 2002, DD 21 design and systems integration elements of this project have been shifted to PE 0604300N, Project 32464, and ship survivability and auxiliary system elements were moved to PE 0603513N, Project 32465. As a result, beginning in FY 2002, this project will focus on the development of open systems architecture for PEO(S), with the efforts for several fleet-focused initiatives continuing as well. The following provides a mission description for each major development area (i.e., Survivability, Auxiliary, and Affordability):

(U) Survivability: The survivability area supports development of systems and protection concepts that reduce vulnerability to conventional weapons and peacetime accidents and enables, under reduced manning conditions, a rapid recovery of mission capability. Development categories include damage control computer-based systems that provide for rapid systems restoration, fire protection devices that improve probability of ship survival with a reduced crew, and ship protection concepts that reduce magazine and commercial equipment vulnerability.

(U) Auxiliary: For existing and future ships, this funding: 1) improves reliability/maintainability of fluid, electrical, and mechanical systems and 2) supports reduced manning through automation of operational, maintenance, and day-to-day functions traditionally performed by the crew, and supports development of auxiliary systems to reduce ship magnetic signature and vulnerability to mines.

(U) Affordability Through Commonality: The Affordability Through Commonality program promotes and enables the PEO(S) implementation of Total Open Systems Architecture (TOSA) solutions that result in mission, technology, and market adaptability and increased competition to achieve reduced Total Ownership Costs. Working with industry, other NAVY acquisition programs and the Fleet, ATC focus areas are total open systems architecture interfaces, processes, and business cases; market research and projections; and technology insertion.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) SURVIVABILITY/AUXILIARY SYSTEMS:
- (U) ($1.389) Completed evaluation/fabrication of Auxiliary Multi-Function Power Module (AMF PM). Completed development of the Integrated Magazine Protection System (IMPS) technologies. Completed laboratory demonstration of automated chilled water and other auxiliary systems with component level control. Validated design tools. Continued development of the time-dependent, computer-based Advanced Survivability Assessment Program (ASAP) for use in evaluating ship designs. Completed development of the ASAP fire and smoke model and continued development of the crew casualty/damage control model. Continued full scale testing aboard the DDG 76 of the advanced closed loop degaussing system. Completed development of the ROV power system.
- (U) ($12.366) Began initial system design and engineering of DD 21 survivability/auxiliary systems.

(U) AFFORDABILITY THROUGH COMMONALITY:
- (U) ($2.304) Across Program Total Ship Open Systems Architecture: Continued Navy-Industry effort to develop, demonstrate, validate and implement fleet-wide open systems architectures (OSA) and non-proprietary standard interfaces. The OSA will employ commercial processes and commercial off the shelf material and equipment to the greatest extent practicable. Continued to refine the Total Ship Open Systems Architecture Framework, including improved guidance on the architecture definition, definition of standard interfaces, and market surveillance and technology projection processes. Continued to define risk mitigation and demonstration and validation projects for the TOSA concept.
- (U) ($4.611) Continued Total Ship Open System Architecture Demonstration and Validation.

(U) FUEL CELL
- (U) ($0.400) Developed conceptual/preliminary designs of 2.5 megawatt (MW) Ship Service Fuel Cell (SSFC) Power Module and initiated detailed design of 0.5 MW reduced scale demonstrator.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY
- (U) ($0.500) Initiated development of improved Shaft Coating System and Smart Tow Monitoring System.

(U) TOC INITIATIVES
- (U) ($1.938) Initiated development of improved commercial-based distribution systems, composite components, and improved ventilation methods/materials that reduce sailor workload.

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

2. (U) FY 2001 PLAN:

(U) SURVIVABILITY/AUXILIARY SYSTEMS:

- (U) ($2.320) Continue development of the time-dependent, computer-based ASAP for use in evaluating ship designs. Continue development of the ASAP crew casualty/damage control model. Continue full scale testing aboard the DDG 76 of the advanced closed loop degaussing system; update prediction algorithm. Continue development of advanced auxiliary systems, components, and control systems.
- (U) ($8.967) Complete initial system design and engineering of DD 21 survivability/auxiliarysystems. Begin system/subsystem development of survivability/auxiliary systems.

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) ($0.916) – TOSA Business Architecture, Process, Impact Assessments: Continue development with Industry of TOSA architectures, framework, and processes for Fleet-wide implementation of open systems architecture in support of future DD 21 use. Continue development of new business architecture, business case analyses, and strategies for TOSA implementation for cross-platform application. Document metrics to assess system architecture openness for technology upgradability and competition. Complete prioritization with Industry of high payoff opening candidates.
- (U) ($0.889) – Total Open Systems Architecture Implementation: Transition TOSA concepts with Industry to the existing and future Fleet in support of future DD 21 use. Complete the engineering development of Open C4ISR Zone concepts for surface combatants and implementation in support of future DD 21 use. Complete development of architecture concepts for open sensor interfaces for surface combatants. Complete development of architecture interface requirements for Advanced TOSA concepts selected with Industry for surface combatants.
- (U) ($5.603) – Complete Total Ship OSA Concept Demonstration and Validation for DD 21 Initial System Design.

(U) FUEL CELL

- (U) ($0.474) Complete design and initiate fabrication of 0.5 MW reduced scale demonstrator. Using current designator, initiate ship impact assessment and cost analysis of SSFC for notional ships and compare with IPS baseline.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY

- (U) ($0.379) Continue development of the Smart Tow Monitoring System and materials to be used in the Improved Shaft Coating System.

(U) TOC Initiatives

- (U) ($1.895) – Continue development of composite components and improved ventilation methods/materials that reduce sailor workload for the existing Fleet.

- (U) ($0.463) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

3. (U) FY 2002 PLAN:

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) ($1.733) TOSA Business Architecture, Process, Impact Assessments: Complete prioritized projections of technology, operational and technical architectures, regulatory, market and cost drivers, benchmarking and market research for use in assessing PEO(S) system's architecture and interface openness. Complete processes and metrics to assess system architecture and interface openness for technology insertion and competition. Develop with industry the TOSA architectures, framework, and processes for PEO(S) implementation of open systems architecture: Complete new business architecture, business case analyses, and strategies for TOSA implementation. Complete economic and other assessments of TOSA implementation for DD-21.

- (U) ($2.197) TOSA Implementation: Transition TOSA concepts with industry. Complete the engineering development and impact assessments of C4I Zone Open Structure and Cooling for surface combatants in support of future DD 21 use. Complete the engineering development and impact assessments of Open Data implementation in support of DD 21 use. Complete the engineering development of open vehicle/material interfaces for surface combatants and implementation of existing surface combatants in support of DD 21 use. Complete development of open sensor interfaces in support of DD 21 use.

(U) FUEL CELL

- (U) ($0.986) Continue SSFC ship impact assessments and model analysis of molten carbonate reduced scale demonstrator and PEM integrated fuel processor.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY

- (U) ($0.394) Perform prototype assembly and testing for the Smart Tow Monitoring System. Continue development of materials for the improved Shaft Coating System. Acquire application hardware for the improved Shaft Coating System.

(U) TOC INITIATIVES

- (U) ($0.296) – Continue development of improved fuel system training that reduce's sailor workload for the existing fleet.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

D. (U) SCHEDULE PROFILE:

PROGRAM MILESTONES	FY 2000	FY 2001	FY 2002
Survivability/Auxiliary Systems Fuel Cell Salvage and Underwater Ship Husbandry TOC Initiatives	1Q Initial System Design 4Q ASAP Fire and Smoke Model 4Q Complete ROV Power System study and monitor thrusters 4Q 2.5 MW Ship Service Fuel Cell Power Module 2Q Initiate Smart Tow Monitoring System 3Q CLDG Ranging of DDG 76 4Q Validate Chilled Water Simulation & Design Tools 2Q Initiate Improved Shaft Coating System 4Q Complete AMF PM	1Q System/Subsystem Development 4Q ASAP Crew Casualty/DC Model 4Q SSFC Ship Impact Assessments	4Q SSFC Fuel Cell and Processor assessments

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

PROGRAM MILESTONES	FY 2000	FY 2001	FY 2002
Affordability Through Commonality (ATC)	4Q Open Systems Architecture Guidance development 4Q SEALINK TRANSITION 4Q DD21 Alliance Teams Flexibility, Upgradability, Supportability, Adaptability preliminary design efforts & technology transfer 4Q Advanced material handling Architectures 4Q Advanced Accommodation Architectures 4Q Open C4ISR Zone concept development 4Q Open Structure Technology Development 4Q Open distributed data interface development	2Q Complete TOSA process and strategy 2Q Complete engineering development of C4ISR Zone Open Foundations 2Q Concept for open sensor and C4ISR Zone data architecture and interfaces 4Q TOSA business case and impact assessments 4Q Concept for open C4ISR Zone electric architecture and interfaces 4Q DD 21 Alliance Teams technology transfer and assessments	1Q Initiate technology, operational and technical architectures, regulatory, market and cost driver projections 2Q Refined TOSA business architecture and metrics 2Q Complete implementation of C4ISR Zone Open Foundations 2Q Open sensor interface requirements 4Q TOSA Process and economic impact assessments complete 4Q Interface requirements for C4ISR Zone open distributed data and electric for surface combatants 4Q DD 21 Industry team partnering and assessments

Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Open Systems Architecture (OSA)/32469						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
SURVIVABILITY												
Primary Hardware Development												
Product Development	Sec845/804	DD 21 Industry Teams	2.020	12.366	11/99	8.967	10/00			0.000	23.353	
	WR	NSWC CD Bethesda, MD	6.848	1.000	Various	2.000	Various			0.000	9.848	
	Various	Other Govt Activities	4.354	0.389	Various	0.687	Various			0.000	5.430	
	Various	Other Contractors	2.635	0.000	Various	0.096	Various			0.000	2.731	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Survivability			15.857	13.755		11.750		0.000		0.000	41.362	
Remarks: Funding for survivability efforts was reprogrammed to PE 0603513N, Project 32465 in FY 2002 and out.												
AFFORDABILITY THROUGH COMMONALITY (ATC)												
Engineering Dev, Demo & Eval	Sec845/804	DD-21 Industry Teams	2.500	4.611	11/99	5.603	10/00	0.000	N/A	0.000	12.714	
	WR	NSWC CD Bethesda, MD	4.936	1.739	10/99	0.800	10/00	0.800	11/01	CONT.	CONT.	
	RC	NSWC CD Bethesda, MD	2.034	0.393	10/99	0.801	11/00	0.950	11/01	CONT.	CONT.	
	Various	Other Govt Activities	2.113	0.172	10/99	0.204	10/00	0.730	11/01	CONT.	CONT.	
	Various	Other Contractors	3.041	0.000	Various	0.000	Various	1.450	11/01	CONT.	CONT.	
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal ATC			14.624	6.915		7.408		3.930		CONT.	CONT.	
Remarks: Funding for DD 21 Industry Teams has been reprogrammed to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out.												

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Open Systems Architecture (OSA)/32469						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
AUXILIARY SYSTEMS, FUEL CELL, SALVAGE AND UNDERWATER SHIP HUSBANDRY, TOC INITIATIVES												
Contractor Engineering Support												
Product Development	SEC 845/804	DD 21 Industry Teams	4.950	0.000	11/99	0.000	N/A	0.000	N/A	0.000	4.950	
	WR	NSWC CD Bethesda, MD	9.734	1.369	11/99	0.890	11/00	0.000	N/A	CONT.	CONT.	
	WR	NSWC CD Philadelphia, PA	0.000	0.743	11/99	0.944	11/00	1.282	11/01	CONT.	CONT.	
	Various	Other Govt Activities	0.811	0.726	11/99	0.465	N/A	0.000	N/A	CONT.	CONT.	
	Various	Other Contractors	0.624	0.000	N/A	0.449	Various	0.394	11/01	CONT.	CONT.	
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Auxiliary Systems			16.119	2.838		2.748		1.676		CONT.	CONT.	
Remarks: Funding for auxiliary system efforts was reprogrammed to PE 0603513N, Project 32465 in FY 2002 and out.												
Total Cost			46.600	23.508		21.906		5.606		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Integrated Topside Design (ITD)/32470					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**15.052**	**14.941**	**(1) 5.396**							
RDT&E Articles Qty	**0**	**0**	**0**							

Note (1): (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to the DD 21 Design line (PE 0604300N, Project 32464) beginning in FY 2002.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops and integrates the necessary technologies to achieve a total integrated topside design focused on DD 21 and future surface combatant ships. Technology areas including topside signature control, sensor and antenna integration, weapon system integration, HM&E integration, related decision-making tools, and composite materials will be addressed. Other stand alone technology programs will be integrated with this effort to assure total ship systems integration for future ship design efforts. Surface combatants will need an added (stealth) layer of defense to support hardkill and softkill systems in defeating future threats. Composite materials that provide improved corrosion control and enable reduced maintenance and reduced manning will also be considered. This project also develops improved equipments that are small but critical components of non-propulsion HM&E systems. This program is directed toward improved affordability, performance, reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and manning reductions for the existing and future fleet. In FY 2002 and out, DD 21 design and systems integration elements of this project have been shifted to PE 0604300N, Project 32464.

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($2.420) Continued validation of composite material design procedures and revision of the PC-based composite materials database. Continued evaluation of composite materials for their corrosion control and reduced maintenance attributes. Continued development of Radar Cross Section (RCS), Infra-red (IR), and Electronic Warfare (EW) prediction codes. Validated and improved EM Engineering Tools. Developed Infrared Signature Database Update. Validated and published Low Observable (LO) Model scaling techniques.
- (U) ($9.803) Initiated engineering efforts required to begin initial system design of an Integrated Topside Design for DD 21.
- (U) ($0.910) Continued development of affordable HM&E machinery and architectures for existing and future fleet. Completed advance gas turbine generator set feasibility design study. Completed specification for heat pipe based bleed air heat exchanger. Completed composite ball valve development, issued final report and delivered ILS package. Initiated investigation of hydrogen power generation and alternate power sources for future platforms.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Integrated Topside Design (ITD)/32470	

- (U) ($1.919) Collect and analyze existing surface combatant topside design issues for application to future generation ships with sensor and communication systems that support future Time Critical Strike and Land Attack weapon systems delivery systems and conduct an assessment using Fleet Battle Experiment India experience.

2. (U) FY 2001 PLAN:
- (U) ($3.421) Continue validation of composite material design procedures materials database. Continue development of RCS, IR, and EW prediction codes. Continue to validate and improve EM Engineering Tools.
- (U) ($10.238) Complete engineering efforts required for initial system design of DD 21 ITD. Begin ITD system/subsystem design for DD 21.
- (U) ($0.947) Complete investigation of hydrogen fuel and other alternate shipboard power sources. Continue development of affordable HM&E machinery and architectures for existing and future fleet and create HM&E future machinery development roadmaps.
- (U) ($0.335) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
-(U) ($0.760) Continue development of RCS, IR, and EW prediction codes. Continue validation of composite material design procedures materials database.
-(U) ($3.636) Continue to validate and improve EM Engineering Tools. Continue validation of composite material design procedures materials database.
-(U) ($1.000) Continue development of affordable HM&E machinery and architectures for existing fleet.

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Integrated Topside Design (ITD)/32470	

D. (U) SCHEDULE PROFILE:

PROGRAM MILESTONES

FY 2000	FY 2001	FY 2002
4Q EM Engineering Tool Validation & Upgrade	2Q Hydrogen assessment report	4Q HM&E assessment report and roadmap
4Q RCS, IR, EW Code Updates	4Q RCS/IR/EW Code Updates	
4Q Composite Design Guide Updates	4Q EM Engineering Tool Validation & Improvement	
2Q G.T. Genset Assessment Report	4Q Composite Design Guide Updates	
4Q 2 Way ball valve ILS package	4Q HM&E future machinery roadmap	
4Q Heatpipe heat exchanger performance specifications		

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Topside Design/32470						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Sec845/804	DD 21 Industry Teams	4.515	9.803	11/99	10.238	11/00	0.000	N/A	0.000	24.556	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			4.515	9.803		10.238		0.000		0.000	24.556	
Remarks: Funding for DD 21 Industry Teams has been reprogrammed to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out.												
Engineering Support	Various	Gov't Activities	14.005	4.545	12/99	3.203	Various	5.096	Various	CONT.	CONT.	
	Various	Contractors	2.430	0.529	12/99	0.100	11/00	0.200	11/01	CONT.	CONT.	
	WR	NSWC CD Bethesda	0.000	N/A	N/A	1.400	10/00	N/A	N/A	CONT.	CONT.	
Software Development	C/CPFF	TBD	2.146	0.175	12/99	0.000	N/A	0.100	12/01	CONT.	CONT.	
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			18.581	5.249		4.703		5.396		CONT.	CONT.	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Topside Design/32470						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support												
Program Management Support												
Miscellaneous												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Total Cost			23.096	15.052		14.941		5.396		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Integrated Power Systems (IPS)/32471					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**24.561**	**90.222**	**106.518**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Integrated Power Systems (IPS) program. IPS provides total ship electric power, including electric propulsion, power conversion and distribution, and mission load interfaces to the electric power system. IPS supports multiple ship class applications for future surface ships, with DD 21 being the primary ship application target. On 6 January 2000, SECNAV announced Navy intent that DD 21 be an electric drive ship with integrated power architecture. The goals of the IPS are to reduce acquisition and operating costs of naval ships and increase military effectiveness. These goals are to be accomplished by leveraging investments in technologies that will be useable by both military and commercial sectors.

- (U) IPS has the potential to revolutionize the design, construction, and operation of U.S. naval ships by using electricity as the primary energy transfer medium aboard ship. The flexibility of electric power transmission allows power generating modules with various power ratings to be connected to propulsion loads and ship service in any arrangement that supports the ship's mission at lowest overall cost. Systems engineering in IPS is focused on increasing the commonality of components used across ship types and in developing modules which will be integral to standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased commonality is to reduce the total cost of ship ownership by using common modules composed of standard components and/or standard interfaces.

- (U) IPS addresses ship platform program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads; improved ship survivability and reduced vulnerability through increased arrangement flexibility and improved electrical system survivability; reduced manning through improved power management systems and reduced on-board maintenance requirements; improved ship signature characteristics; improved design adaptability to meet future requirements of multiple ship types or missions; integrating power management and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load management functions; simplified technology insertion which allows new technologies to be installed within IPS much less expensively than presently possible; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components. The efforts in this project are divided into three major areas as follows:

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471

- (U) System development: consists of the efforts necessary to develop and demonstrate broadly applicable warfighting improvements and cost reductions as well as related efforts for ship platform and mission load interface applications.

- (U) Platform Specific Development: includes all efforts to design, develop, qualify, and test integrated power system equipment for ship specific application including DD 21. This includes Permanent Magnet (PM) motor and motor drive technologies

- (U) At Sea Testing: At Sea Testing of IPS subsystems and components will be conducted on the RV Triton Trimaran Demonstrator developed and built under a US/UK cooperative Memorandum of Understanding (MOU) signed 3 September 1997. The RV Triton was launched on 6 May 2000 under the contract for construction awarded in July 1998. The RV Triton is constructed with a commercial electric drive system as well as provisions for fitting and testing of IPS components. Initial testing on the RV Triton is non-IPS and will focus on Naval Architectural and sea-keeping aspects of the trimaran hull form. An opportunity for the US to backfit IPS components and conduct follow-on at sea testing is built into the MOU. The US financial contribution to the MOU is also funded from this project. The efforts in this project support the procurement, installation, and at sea testing of IPS components on the RV Triton.

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($13.140) Systems Development: Continued IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Completed Advanced Development (AD) Phase I Land Based Engineering Site (LBES) data analyses and issued Phase I test reports. Completed AD Phase II testing at NSWCCD, Philadelphia, PA that included controls and power management upgrades, demonstrated ship service system operation through various modes, and incorporated multi-workstation control and automated reconfiguration. Awarded 804/845 Agreements in December 1999 for Integrated Fight Through Power (IFTP). IFTP Agreements were awarded to mitigate potential risks associated with a fielded IPS system. Efforts included review and modification of IFTP requirements to better leverage commercial product lines, completed preliminary design, and began detailed design of hardware required to replace Functional Equivalent Modules (FEMs) and populate IPS baseline configuration for fight through power and survivability testing. Continued propulsion motor analysis using the reduced scale Laboratory Drive Motor. Conducted mission load interface survivability, availability, and survivability studies. Continued development of VSD motor controller for auxiliary applications. In conjunction with United Defense, DD21 gun system manufacturer, and Raytheon, DD21 multi-functioning radar (MFR) manufacturer, provided recommendations that optimize power interfaces of their respective system. Provided characterization of IPS configurations for the range of ship variants in support of JCC (X) Design Ship Study Group Phase I studies. Began development of notional command ship power requirements. Refined IPS designs for JCC (X) ship variants that were carried into Phase II studies. Initiated definition and characterization of IPS configurations for LH (X) pre-MS 0 preparatory studies. Initiated development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471

- (U) ($10.971) Platform Specific Development: DD 21 industry teams evaluated alternative DD 21 power system configurations. Completed concept studies and began preliminary design of competing PM motors and motor drives. Began IPS platform specific risk reduction.

- (U) ($0.450) At Sea Testing: Initiated IPS systems requirements definition and began development of IPS control system requirements for use during at-sea testing.

2. (U) FY 2001 PLAN

- (U) ($32.322) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Conduct AD Phase III testing at NSWCCD, Philadelphia PA. Demonstrate the total system operation through various modes and the survivability and zonal isolation/fight through features of the advanced development system. Demonstrate automated system reconfiguration and start up. Continue IFTP and solid state power conversion efforts to mitigate potential risks associated with a fielded IPS system. Efforts include completing detailed design and risk reduction and begin fabrication of hardware required to populate IPS baseline configuration fight through testing. Conduct initial combat systems/survivability demonstration to show improved performance and potential to reduce combat system costs. Test and demonstrate VSD motor controller for auxiliary applications. Continue IPS configuration development in support of JCC (X) Design Ship Study Group Phase II studies and AoA. Continue support for LH (X) studies. Initiate development/modification of IPS ship configuration documentation including CONOPS, System Level Description/Requirements, and module performance specifications as necessary to support power system requirements for JCC (X). Continue development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

- (U) ($52.276) Platform Specific Development: Complete preliminary design of competing PM motors and motor drives and incorporate preferred motor options into DD 21 IPS system designs. Begin detailed design of PM motor and PM motor risk reduction. DD 21 industry teams finalize proposed configurations. Navy evaluate competing DD 21 team proposals and down-select to single vendor. Selected vendor to: continue detailed ship system design of DD 21 IPS system and DD21 IPS system risk reduction, and begin ordering Long Lead Material (LLM).

- (U) ($3.550) At Sea Testing: Perform preliminary design of RV Triton IPS components. Begin detailed design of hardware required for at sea testing. Continue development of IPS control system for use during at-sea testing.

- (U) ($2.074) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471	

3. (U) FY 2002 PLAN:

- (U) ($11.892) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Continue to demonstrate automated system reconfiguration and start-up. Continue IFTP efforts to mitigate potential risks associated with a fielded IPS system. Efforts include continuing hardware fabrication and conducting factory acceptance testing of hardware required to populate IPS baseline configuration for fight through testing. Begin modification of test site design for IPS integrated fight through power testing at NSWCCD, Philadelphia PA. Evaluate emerging technologies for ship applications to determine future feasibility and development requirements. Emerging technologies include technologies such as fuel cells and power electronics. Conduct combat systems/survivability demonstration to show improved performance and potential to reduce combat system costs. Continue IPS configuration development in support of JCC (X) and LH (X) ship programs. Continue to develop/modify IPS ship configuration documentation including CONOPS, System Level Description/Requirements, and module performance specifications as necessary to support power system requirements for JCC (X) and LH (X). Continue development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

- (U) ($91.526) Platform Specific Development: Complete detailed ship system design of DD 21 IPS system. Complete detailed design of PM motor. Continue PM motor and DD 21 IPS system risk reduction. Begin fabrication of full scale PM motor. Continue ordering other material for test. Determine representative test hardware configuration and begin modification of test site design for IPS qualification and testing at NSWCCD, Philadelphia PA.

- (U) ($3.100) At Sea Testing: Complete detailed design and begin procurement of hardware required for at sea testing. Continue detailed development and design of the RV Triton IPS configuration for at sea testing. Continue development of IPS control system modifications for use during at-sea testing.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

(U) IPS is a candidate system for DD 21 and all other future surface ships.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER Integrated Power Systems (IPS)/32471

D. (U) SCHEDULE PROFILE:

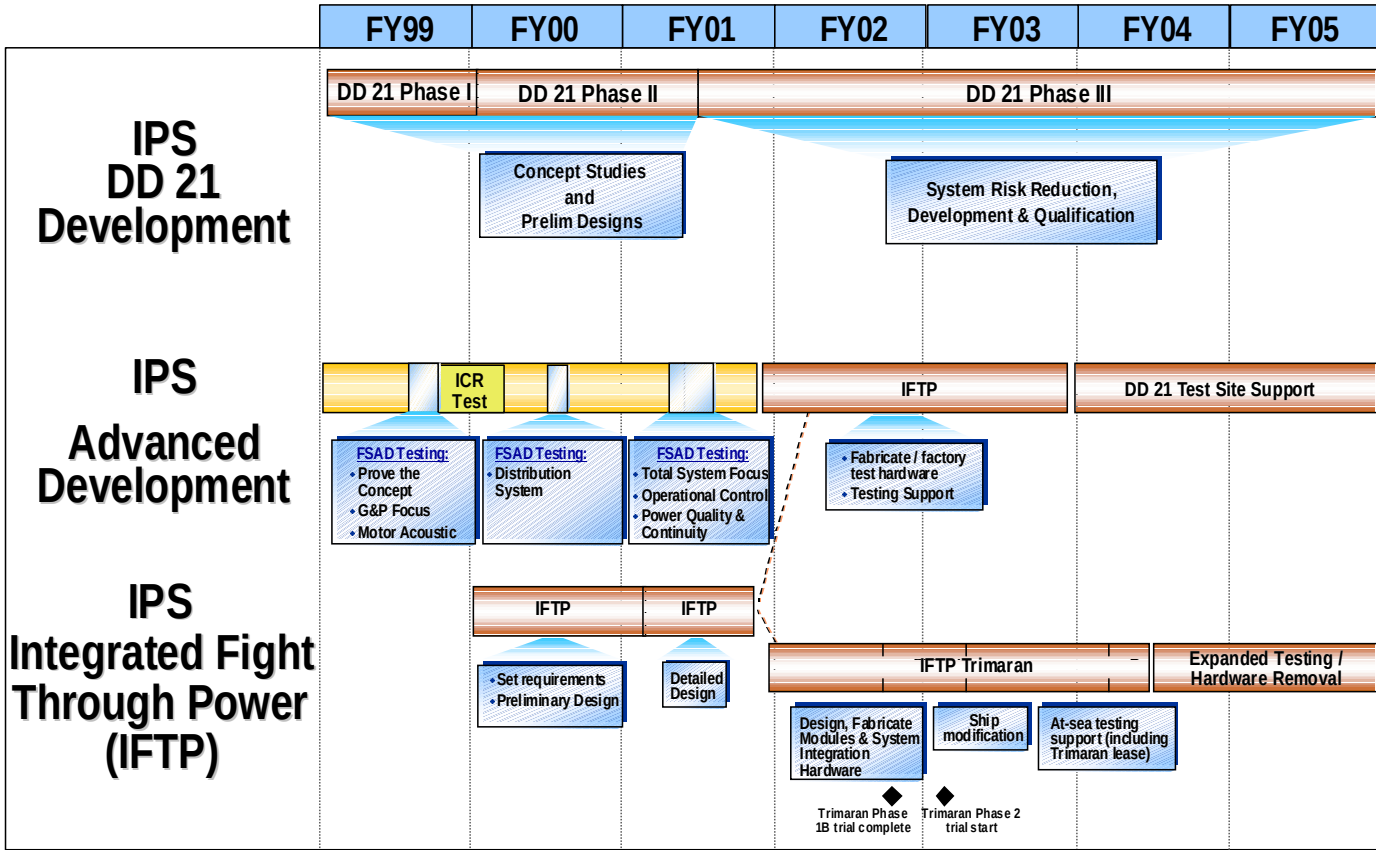

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NAME AND NUMBER						
RDT&E, N/BA-4		**Shipboard Sys Comp Dev/0603513N**				Integrated Power System/32471						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	Lockheed M Syracuse, NY	22.072	0.000	N/A	2.500	02/01	0.000	01/02	CONT.	CONT.	
	Sec845/804	DD 21 Industry Teams	4.000	10.971	11/99	10.154	01/01	0.000	N/A	0.000	25.125	
	CPIF	DD 21 FSC	0.000	0.000	N/A	42.122	06/01	91.526	11/01	CONT.	CONT.	
	Sec845/804	IFTP Teams	1.200	2.248	12/99	24.337	12/00	11.042	12/01	CONT.	CONT.	
	US/UK MOU	DERA, UK	0.000	0.000	N/A	1.550	12/00	0.550	12/01	CONT.	CONT.	
	WR	NSWCCD Philadelphia, PA	7.888	3.911	12/99	6.100	12/00	1.800	12/01	CONT.	CONT.	
	MISC	Other Contractors	2.685	3.038	12/99	1.294	12/00	0.900	12/01	CONT.	CONT.	
	MISC	Other Govt Activities	0.845	0.180	12/99	0.100	12/00	0.100	N/A	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Subtotal Product Development			38.690	20.348		88.157		105.918		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Power System/32471						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC CD Philadelphia, PA	9.038	4.100	12/99	1.940	12/00	0.500	12/01	CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			9.038	4.100		1.940		0.500		0.000	CONT.	
Remarks:												
Contractor Engineering Support												
Program Management Support												
Miscellaneous	Various	Various	0.201	0.113	12/99	0.125	12/00	0.100	12/01	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.201	0.113		0.125		0.100		CONT.	CONT.	
Remarks:												
Total Cost			47.929	24.561		90.222		106.518		CONT.	CONT.	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Radiological Controls/0603542N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**0.585**	**0.567**	**1.056**						**CONT.**	**CONT.**
RADIAC Development/S1830	**0.585**	**0.567**	**1.056**						**CONT.**	**CONT.**
Quantity of RDT&E Articles										

A. Mission Description and Budget Item Justification:

Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices in direct support of the Navy Nuclear Propulsion Program and other users by providing accurate, reliable Health Physics instrumentation at the lowest possible life cycle cost. Reliable radiation monitoring instruments are needed to ensure the radiological safety of Navy personnel. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. The Navy Dosimetry System will be able to meet new NRC regulations and will provide sensitive measurements down to the levels required for all new and imminent health and safety requirements. The Multifunction RADIAC will cut calibration costs and reduce the requirements for spare parts by replacing over 16 different models of obsolete equipment. New requirements for the measurement of lower neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service applicability.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N

(U) Program Accomplishments and Plans:

FY 2000 ACCOMPLISHMENTS:

- (U) ($ .292) Continue the development of Navy Dosimetry System.
- (U) ($ .293) Continue the development of MFR directional gamma probe. Continue the development of extendable probe and frisker station.

FY 2001 PLAN:

- (U) ($ .249) Complete the development of the Navy Dosimetry System.
- (U) ($ .254) Complete the extendable probe and frisker station and begin the development of neutron probe.
- (U) ($ .064) Resume development of the casualty dosimeter.

FY 2002 PLAN:

- (U) ($ .714) Continue development of the MFR neutron probe and begin development of the radiography probe.
- (U) ($ .146) Complete development of the casualty dosimeter.
- (U) ($ .196) Begin enhancements for the Navy Dosimetry System.

B. Program Change Summary:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	0.601	0.572	0.566
(U) Appropriated Value	0.601	0.572	0.566
(U) Adjustment to FY 2000/2001 Appropriated Value/FY 2001 President's Budget	-0.016	0.000	0.500
(U) .7% Pro-Rata Reduction		-0.004	
(U) Minor Pricing Adjustments		-0.001	-0.010
(U) FY 2002 PRES Budget Submit:	0.585	0.567	1.056

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N

Change Summary Explanation:
Funding: The FY01 decrease of ($-.020M) is for Adjustments for FY 2000/2001 Appropriated Value. The FY 01 decrease of ($-.004M) is for .7% Congressional Pro-Rata reduction and ($-.001M) in minor pricing adjustments. The FY 02 decrease of ($-.010M) is for minor pricing adjustments.

Schedule: Not applicable.
Technical: Not applicable.

C. Other Program Funding Summary:

	FY 2000	FY 2001	FY 2002	To Complete
OPN BLI: 292000 RADIAC	4.168	8.232	7.876	CONT.

D. Acquisition Strategy:
Development efforts are being focused on evaluation, modification (as required to meet operational requirements), and adaptation of Commercial Off-The-Shelf technology in order to minimize total ownership costs. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.

E. Schedule Profile:
Dosimetry System
- Delivery of Advance Development Systems – 2/00
- Completion of Testing – 6/00
- Milestone III Decision – 8/01
- Initial Operational Capability – 12/02

MFR Enhancements/Probe Development
- Delivery of Prototypes for Extendable Probe (EP) – 1/99
- Completion of Testing for EP – 4/99

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N

MFR Enhancements/Probe Development con't.
- Delivery of Revised Prototype - 3/01
- Completion of Testing of Revised Prototype- 7/01
- Production Contract Awarded for EP – 10/01
- Delivery of Prototypes for Directional Gamma Probe (DGP) – 11/99
- Completion of Testing for DGP – 4/00
- Production Contract Awarded for DGP – 6/01
- Award Contract for Frisker Station Development - 4/00
- Delivery of Frisker Station – 12/00
- Completion of Testing of Frisker Station – 5/01
- Production Contract Awarded for Frisker Station - 10/01

Casualty Dosimeter
- Complete SBIR Phase II Testing – 1/99
- Complete Testing of revised Casualty Dosimeter - 9/01

IM-239 Enhancements
- Award Enhancement Contract – 3/00
- Delivery of Test Samples – 12/00
- Test and Evaluation Complete - 4/01

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Radiological Control/0603542N**	RADIAC Development Project - S1830

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Dev Dosimetry	C/FP	Various (See below)	8.697	0.000		0.000		0.000		CONT.	CONT.	
Primary Hardware Dev Miscellaneous	C/FP	Various	6.092			0.000		0.481	03/02	CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering	WR			0.380	12/99	0.370	10/00	0.319	10/01		1.069	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			14.789	0.380		0.370		0.800		CONT.	CONT.	

Remarks:
Prior to 8/96 - International Sensor Technology, Pullman, Washington
12/96 - 7/98 - Keithley Radiation Measurements, Cleveland, Ohio
Follow-on contract will be competed

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Not applicable

Exhibit R-3 Cost Analysis (page 2) **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Radiological Control/0603542N**	RADIAC Development Project/S1830

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	Various	3.323	0.195	12/99	0.187	10/00	0.246	10/00	CONT.	CONT.	
Operational Test & Evaluation			0.329								0.329	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			3.652	0.195		0.187		0.246		CONT.	CONT.	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support	WR	Various	5.045							CONT.	CONT.	
Program Management Support	WR	Various	5.046							CONT.	CONT.	
Travel			0.010	0.010	12/99	0.010	10/00	0.010	10/00	CONT.	CONT.	
Labor (Research Personnel)			0.788								0.788	
Overhead											0.000	
Subtotal Management			10.889	0.010		0.010		0.010		CONT.	CONT.	
Remarks:												
Total Cost			29.330	0.585		0.567		1.056		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 56

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY**					R-1 ITEM NOMENCLATURE PE 0603553N Surface ASW/V1704 ASW Adv Dev					
COST ($ in Millions	FY2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**6.723**	**6.690**	**3.724**						**Continuous**	**Continuous**
ASW Advanced Development/V1704*	**6.723**	**0.000**	**0.000**						**Continuous**	**Continuous**
ASW Advanced Development/S1704*	**0.000**	**6.690**	**3.724**						**Continuous**	**Continuous**
Quantity of RDT&E Articles										

Note *: Due to realignment of Program Executive Office, Undersea Warfare (USW), FY2000 funds allocated under V1704 and FY2001 and beyond funds allocated under S1704.

A. Mission Description and Budget Item Justification: The ASW Advanced Development project provides advanced development demonstration and validation of technology for potential surface sonar and combat system applications. Efforts focus on resolution of technical issues associated with providing capability against the Year 2005 and beyond threat with emphasis on shallow water/littoral area USW a dem/val of Undersea Warfare (USW) concepts and technology. Key technology areas include active sonar transmissions, advanced signal and data processing, active sonar classification, towed and hull arrays and transducer technology, multi-static sonar, and multi-sensor data fusion including multi-platform data fusion and netcentric undersea warfare concepts. This Program Element, 0603553N, has been designated to support Multi-Static Active ASW (MAASW) efforts associated with the Distant Thunder program and other emerging multi-static technologies. The MAASW project conducts advanced development and testing of active multistatic acoustic concepts. The concept development is directed at providing surface ships combat groups with the capability of detection, classification, and localization of quiet threat submarines in difficult acoustic environments associated with Littoral waters. The project concentrates on the development of acoustic processor algorithms, alternative cost-effective active sources and information sharing technologies to develop a coordinated multi-static acoustic picture employing distributed sensors and active sources.

Program Plans and Accomplishments:

1. (U) FY 2000 Accomplishments:

($2.831) Multistatic Active ASW: Improved acoustic processing and communication schemes. Participated in SHAREM 134 to collect multi-static processors/communication systems data and environmental acoustic data and analyze and/or demonstrate system performance. Initiated development of Concept of Operations.

($3.892 Advanced Undersea Warfare Concept (AUSWC): Provided systems engineering, development, and integration for AUSWC Builds 1.0 and 2.0. Performed Battle Group platform interface investigation, installation planning and scheduling, platform installation and integration for AUSWC first build.

1. (U) FY 2001 Plan:

($2.963) Multistatic Active ASW: Continue improvement of acoustic processing and communication schemes. Participate in sea tests, SHAREM 136 and 138, to collect multi-static processors/communication systems data and environmental acoustic data and analyze/evaluate system performance and alternative acoustic sources in Littoral ASW environments. Begin Advanced Processing Build (APB) process in preparation for integration of coherent waveform processing algorithms. Complete development of Impulsive Source Concept of Operations. Install Advanced Development Model (ADM) Type K R&D SHIPALTS on N76 specified COMDESRON Fifteen test ships.

($3.640) Advanced Undersea Warfare Concept (AUSWC): Field and demonstrate a network-centric Undersea Warfare (USW) theater combat system to support air, surface, and sub-surface platforms of the Carl Vinson Battlegroup. Support second installation (Build 2.0) plan for Carl Vinson Battlegroup for selected battlegroup platforms.

($.087) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY**	R-1 ITEM NOMENCLATURE PE 0603553N Surface ASW/V1704/S1704 ASW Adv Dev

3. FY 2002 Plan:

($3.724) Multistatic Active ASW: Upgrade air deployed advanced deve multistatic processing system. Integrate multi-static active coherent waveform signal processing algorithms. Improve support and interface to shipboard Combat Information Center (CIC) watch standers. Address coherent waveform capabilities in concept of operations and tactical documentation. Initiate preparation for product(s) transition to AN/SQQ-89(V)15.

B. Program Change Summary:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	6.948	6.752	2.986
Appropriated Value:	2.949	6.752	
Adjustment to FY2000/2001Appropriated Value/	+3.774	-0.047	0.738
Government-Wide Rescission:		-0.015	
FY 2001 President's Budget:			
FY 2002/2003 OSD/OMB Budget Submit:	6.723	6.690	3.724

(U) Change Summary Explanation:

(U) FY 2000 decreases: SBIR transfer (-0.150), Mid-yr Review Adjustment (-0.056), Proportionate Reductions (-0.012), actuals (-0.007) increase: Advanced USW Concept (+3999).
(U) FY 2001 decreases of (-0.047) for 7% Pro-Rate reduction, Government-Wide Rescission (-0.015)
(U) FY 2002 increases of (+0.750), Distant Thunder (N88 Funding), Non-Pay Inflation Bas (+0.003), Program Support (+0.012) and Final POM 02 Balance decrease (-0.005) Undersea Warfare decrease (-0.004) NWCF Rates - Naval Air Warfare decrease (-0.005), NWCF Rates - Naval Undersea Warfare (-0.012) and NWCF Rates - Naval Air Warfare (0.001).

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary: N/A

Related RDT&E:

PE 0205620N (Surface ASW Combat Systems Integration)
PE 0603504N (Advanced Submarine Combat Systems Development)
PE 0603513N (DD-21 Associated System Development)
PE 0603561N (Advanced Submarine System Development)
PE 0603747N (Undersea Warfare Advanced Technology)

D. Acquisition Strategy: Plan to continue competitively awarded contract(s).

E. Schedule Profile: See attached Schedule.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**	PROGRAM ELEMENT NAME AND NUMBER **Surface ASW, PE 0603553N**				PROJECT NAME AND NUMBER **ASW Advanced Development, V1704/S1704**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**6.723**	**6.690**	**3.724**							
RDT&E Articles Qty										

SURFACE ASW ADVANCED DEVELOPMENT

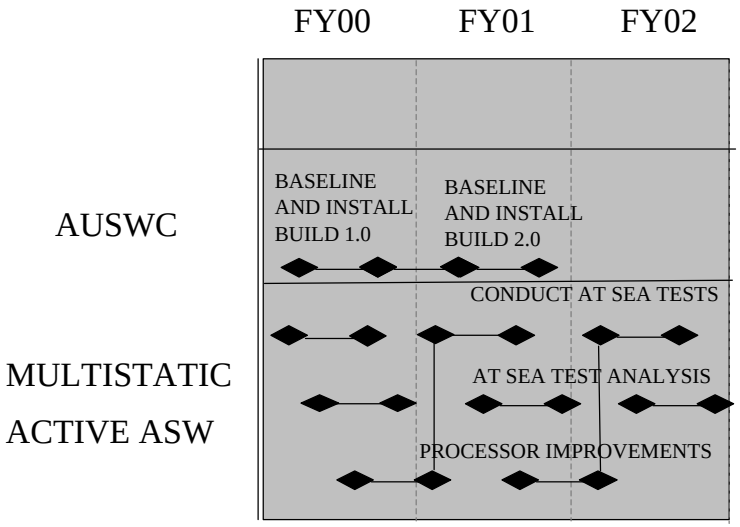

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N	**Surface ASW/ PE 0603553N**	**ASW Advanced Development/V1704/S1704**

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Multistatic Sonar Development	WR	NUWC/Npt	10.397	1.098	12/99	1.325	04/01	1.266	12/01	Continuous	Continuous	
Multistatic Sonar Development	WR	BATH MIN		0.010	09/00	0.011	11/00					
Multistatic Sonar Development	WR	PASCAGOULA MS		0.010	09/00	0.007	01/01					
Multistatic Sonar Development	WR	NAWC/KEY WEST		0.010	01/00							
Multistatic Sonar Development	WR	NAWC/Pax River	0.100	0.363	10/99	0.250	02/01	0.750	12/01	Continuous	Continuous	
Multistatic Sonar Development	CPFF	BBN		1.037	03/00	0.930	10/00	1.150	03/02	Continuous	Continuous	
Multistatic Sonar Development	CPFF	APL/JHU	0.116	0.110	01/00	0.100	02/01	0.108	01/02	Continuous	Continuous	
Multistatic Sonar Development	RCP/WR	NRL	0.212									
Multistatic Sonar Development	WR	NUWC/Keyport	1.400									
Multistatic Sonar Development	WR	NSWC/DD	0.108									
Multistatic Sonar Development	RCP	FLT. INDUR. SUP. CTR		0.010	10/00							
Multistatic Sonar Development	RCP	ONR	0.868	0.127	03/00	0.295	03/01	0.400		Continuous	Continuous	
Subtotal Product Development			13.201	2.775		2.918		3.674		0.000	22.568	

Remarks:

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2) | DATE: June 2001

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N	**Surface ASW/PE 0603553N**	**ASW Advanced Development/V1704/S1704**

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost (K$)	FY 00 Award Date	FY 01 Cost (K$)	FY 01 Award Date	FY 02 Cost (K$)	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWC/Npt	0.200	1.004	10/99	1.200	12/00			Continuous	Continuous	
Developmental Test & Evaluation	WR	NAWC/Pax River	0.000	0.165	03/00	0.692	12/00			Continuous	Continuous	
Developmental Test & Evaluation	CPFF	BBN	0.000	0.000						Continuous	Continuous	
Developmental Test & Evaluation	WR	SUPSHIP BATH MIN.	0.000	0.033	09/00					Continuous	Continuous	
Developmental Test & Evaluation	WR	NUWC/Keyport	0.600	0.443	10/99	0.488	12/00			Continuous	Continuous	
Developmental Test & Evaluation	WR	NSWC/Carderock, MD	0.100	0.308	10/99	0.281	12/00			Continuous	Continuous	
Developmental Test & Evaluation	WR	NSWC/Dahlgren, VA	0.150	0.040	10/99		12/00			Continuous	Continuous	
Developmental Test & Evaluation	CPFF	APL/JHU, MD		0.626	01/00	0.210	03/01			Continuous	Continuous	
Developmental Test & Evaluation	CPFF	Progeny, Inc.		0.500	01/00	0.640	03/01			Continuous	Continuous	
Developmental Test & Evaluation	CPFF	APL/UW	0.050	0.000								
Developmental Test & Evaluation	CPFF	IPD	0.050	0.055	12/99							
Developmental Test & Evaluation	MIPR	U.S. ARMY/MITRE		0.000								
Developmental Test & Evaluation	WR	SPAWAR Systems Center	0.250	0.435	10/99	0.101	12/00			Continuous	Continuous	
Subtotal T&E			1.400	3.609		3.612		0.000		Continuous	Continuous	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support	CPFF	Stanley Assoc.	1.326	0.319	11/99	0.140	01/01	0.050		Continuous	Continuous	
Travel			0.145	0.020		0.020				Continuous	Continuous	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			1.471	0.339		0.160		0.050		Continuous	Continuous	
Remarks:												
Total Cost			16.072	6.723		6.690		3.724		Continuous	Continuous	
Remarks:												

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE SSGN 0603559N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**0.000**	**37.416**	**30.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
SSGN Trident Conversion/F2413	**0.000**	**37.416**	**30.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: The SSGN will establish a robust and covert land attack strike and Special Operating Force (SOF) platform fully integrated into a joint battlespace with minimal external support. The platform will enable launch of 100 attack missiles (e.g. Tomahawk) in a single salvo. The SOF campaign will influence events ashore prior to the commencement of hostilities. SOF platform capabilities will include support for over 60 SOF personnel and two Advanced Seal Delivery Systems or Dry Deck Shelters for periods up to 90 days. The platform replaces two dedicated SOF submarines scheduled for inactivation, the USS Polk and USS Kamehameha.

(U) Program Accomplishments and Plans:

1. (U) FY 2000 Accomplishments :

(U) FY 2000 efforts are funded under PE 0603563N .

(U) FY 2001 Plan:

2. (U) ($12.542) Conduct design activities for risk mitigation, alternative selection, and conversion planning.
(U) ($15.428) Commence Attack Weapons Systems design and risk mitigation activities which will include: Missile Tube and Launcher/Canister design, test plan development, handling equipment development, and test program fabrication, hardware and software design for the Attack Weapons Systems Fire Control System and design of navigation subsystems.
(U) ($ 8.670) Commence engineering studies and efforts for ship control, safety, hydrodynamics, test and evaluation, and required technical and milestone documentation.
(U) ($ 0.776) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE SSGN 0603559N

3. (U) FY 2002 Plan:

(U) ($6.000) Conduct platform preliminary design - ship arrangement drawings, ship system diagrams, lock-out chamber engineering development, and platform conversion HM&E engineering development.

(U) ($18.000) Conduct Tomahawk Attack Weapons System Preliminary Design - attack weapons control system (Fire Control) engineering development, Preliminary Tomahawk Weapons Control System software development, Multiple All-Up-Round Canister (MAC) Concept Development and Underwater missile launch r reduction.

(U) ($6.000) project management support costs - Milestone documentation development, Program planning/schedule development/critical path analysis/shipyard liaison, CCS/Electronics technical engineering, integration, and weapons systems safety support, HM&E (hydro/ship control/platform integration/signatures/etc)engineering and technical design support.

B. (U) Program Change Summary:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	0.000	34.762	0.000
Appropriated Value:	0.000	34.762	0.000
Adjustments to FY2001 Appropriated Value/ FY 2001 President's Budget:	0.000	2.654	0.000
FY 2002 President's Budget Submit	0.000	37.416	0.000

(U) Change Summary Explanation:

(U) Funding: FY 2001 funding change is -$.264 .7% Pro-Rata Congressional reduction; +$3.000 Congressional adjustment; -$.82 Government wide Rescission.

(U) Schedule: Not Applicable.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE SSGN 0603559N

C. (U) Other Program Funding Summary:

	FY 2000	FY 2001	FY 2002	To Complete	Total Cost
(U) SCN - SSGN Conversion	0.000	0.000	86.400	0	0.000

- (U) Related RDT&E:

(U) PE 0603563N Ship Concept Advanced Design

D. (U) Acquisition Strategy

(U) To refuel, overhaul, convert and deliver four Trident Submarines into land attack strike and Special Operating Force platforms.

E. (U) Schedule Profile:

(U) See attached Planning Schedule.

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT SSGN 0603559N			PROJECT NAME AND NUMBER						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering	SS/CPFF	General Dynam Groton, CT	0.000	0.000		13.673	Various			0.000	Continuing	
Systems Engineering	WR	NSWC Carderock, MD	0.000	0.000		2.000	10/00			0.000	Continuing	
Systems Engineering	WR/RC	NSWC Dahlgren, VA	0.000	0.000		1.200	10/00			0.000	Continuing	
Systems Engineering	WR	NUWC Newport, RI	0.000	0.000		1.520	Various			0.000	Continuing	
AWS Risk Reduction	C/CPFF	Various	0.000	0.000		12.503	10/00			0.000	Continuing	
AWS Concept Exploration	WR/MIPR	NAVAIR	0.000	0.000		1.725	10/00			0.000	Continuing	
Systems Engineering	Various	Various	0.000	0.000		1.237	Various			0.000	Continuing	
Award Fees											Continuing	
Subtotal Product Development			0.000	0.000		33.858		0.000		0.000	Continuing	
Remarks:												
Development Support Equipment											Continuing	
Software Development											Continuing	
Training Development											Continuing	
Integrated Logistics Support											Continuing	
Configuration Management											Continuing	
Technical Data											Continuing	
GFE											Continuing	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	Continuing	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)											DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT SSGN 0603559N				PROJECT NAME AND NUMBER						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Developmental Test & Evaluation											0.000	
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support & ETS	Various	Various	0.000	0.000		3.508	Various			0.000	3.508	
Travel						0.050					0.050	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		3.558		0.000		0.000	3.558	
Remarks:												
Total Cost			0.000	0.000		37.416		0.000		0.000	3.558	
Remarks:												

R-1 SHOPPING LIST - Item No. 58-5 of 58-5

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 6 of 6)

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	**127.615**	**128.082**	**110.766**							
Adv. Sub. Systems Development/S2033	**41.009**	**47.642**	**49.457**							
Enhanced Performance Metal Brush/S2756	**2.221**	**2.972**	**0.000**							
Adv. Sub. Combt Sys. Dev/V0223	**76.640**	**0.000**	**0.000**							
Adv. Sub. Combt Sys. Dev/S0223*	**0.000**	**66.569**	**61.309**							
Conf Array Vel Sensor/V2753	**2.912**	**0.000**	**0.000**							
Conf Array Vel Sensor/S2753	**0.000**	**4.954**	**0.000**							
Common Towed Array Prog/V2754	**1.933**	**0.000**	**0.000**							
Common Towed Array Prog/S2754	**0.000**	**5.945**	**0.000**							
Afford Adv Acoustic Arrays/V2755	**2.900**	**0.000**	**0.000**							

Note *: Due to realignment of Program Executive Office, FY2000 funds are allocated under V0223 and for FY2001 and beyond funds will be allocated under S0223.

(U) This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible

(U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The Program also supports two Information Exchange Programs with the United Kingdom, (one on submarine electromagnetic silencing and the second on submarine platform equipment, systems, and hull technology); operates the Large Scale Vehicle to provide at-sea test capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the Hydrodynamic/Hydroacoustic Technology Center to enhance the Navy's ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; operates and supports the Intermediate Scale

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N

Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the Program is constructing a second large scale vehicle, LSV2.

This Program has been structured to support near term VIRGINIA Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth. (U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric motors and generators.

U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sonar and combat control systems improvements. The program addresses technology challenges that marginalize tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battlespace preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware / software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Specific technology areas include transducers, hull and towed arrays, monostatic and bistatic sonar signal processing, net-centric warfare, target motion analysis (TMA), multiple contact processing. Program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) Projects V2753, V2754, and V2755 are authorized by Congress to pursue the application of fiber optic technology in submarine acoustic array systems as potential cost and performance improvements to future operational sonar array systems.

B. (U) Program Change Summary:	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget	115,767	113,269	121,064
Appropriated Value:	115,767	113,269	
Adjustment to FY 2000/2001 Appropriated Value/			
FY 2001 President's Budget:	11,848	14,813	-10,298
FY 2002 PRES Budget Submit:	127,615	128,082	110,766

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N

(U) Change Summary Explanation:

(U)S2033 Funding:
FY 2000 decreases of ($3.126M) is attributed to an increase of ($0.057M) to Restore Issue 62288 Outsourcing, decrease of ($-0.051M) for SSP contracts, decreases of ($-0.243M) for across the board reduction, decreases of ($-2.0M) ONR BTR update (May-00), decreases of ($-0.141M) FY00 SBIR Load June 00, decreases of ($-0.172M) Section 8055: proportionate reduction and ($-0.576M) for various minor program adjustments.

FY 2001 increase ($1.558M) is attributed to decreases of ($-0.337M) for Section 8086: .7% Pro-rata reduction, increases of ($2.000M) for Adv. Composite sail, and decreases of (-$0.105M) for a government wide rescission FY 2002 decreases of ($-5.317M) is attributed to a decreases of (-$0.067M) for various minor program adjustments, (-(-$0.447M) for NWCF Rate Adjustment, a decrease of ($-5.0M) for 93R/ASTO to Core plus DARPA, an increase of ($0.036M) for Non-Pay inflation, an increase of ($0.161M) for program support,

(U)V0223 Funding: FY 2000 increase of ($5.018M) is attributed to an increase of ($8.018M) for program adjustments, and decreases of (-$1.333M) for Advanced Undersea Warfare, (-$0.388M) for Across the Board Reduction, (-$1.0M) for other adjustments, and (-$0.279M) Proportionate reduction.

(U)S0223 Funding: FY 2001 decreases of (-$0.616M) is attributed to a decrease of (-$0.470K) for .7% pro-rata reduction and (-$0.146M) for Government -Wide Rescission. FY 2002 decrease of (-$4.981M) is attributed to a decrease of (-$0.754M) for various minor program adjustments, (-$5.0M). for 93R Asto to Core Plus DARPA, (-$0.004M)
for BSO Actual Update, (-$0.168M) for NWCF Rate adjustments, increases of ($0.199M) for Program Support .

(U)S2753 Funding: FY2000 increase of ($2.912M) is attributed to an increase of ($3.0M) for Caves and decreases of (-$0.017M) for Across the Board reduction, (-$0.059M) for Small Business Innovative Research load and -($0.012M) for Proportionate reduction. The FY2001 increase of ($4.965) is attributed to a an increase of ($5.0M) for Conformal Acoustic Velocity Sonar and a decrease of (-$0.035M) for 7% pro-rata reduction and (-$0.11K) for Government-Wide Rescission.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N

(U)S2754 Funding: FY2000 increase of ($1.933M) is attributed to and increase of ($2.0M) for Common Towed Array, and decreases of (-$0.011M) for Across the Board Reduction, (-$0.040M) for Small Business Innovative Research load and (-$0.008M) for Section 8055: Proportionate reduction and (-$0.008M) for minor program adjustments. FY2001 increase of ($5.945M) is attributed to an increase of ($6.0M) for Common Towed Array and a decrease of (-$0.042M) for Section 8056 .7% Pro-rata reduction. and
(-$0.013M) Government Wide Rescission .

(U)S2755 Funding: FY2000 increase of (($2.900M) is attributed to an increase of ($3.0M) for 631 - Affordable Advanced Acoustic Array and decreases of ($-0.017M) for Across the Board reduction, (-$0.059M) for Small Business Innovative Research load, (-$0.012M) for Proportionate reduction and (-$0.012M) for various minor program adjustments.

(U)S2756 Funding: FY2000 increase of (2.221M) is attributed to an increase of ($2.3M) for 631 - High Performance Brush Technology and decreases of ($-0.013M) for Across the Board reduction, (-$0.057M) for Small Business Innovative Research load and (-$0.009M) for Section 8055: Proportinate reduction. FY2001 increase of ($2.972M) is attributed to an increase of ($3.0M) for High Performance Bruch Technoloby and a decrease of (-$0.021M) for Section 8086: .7% Pro-Rata reduction.
and (-$0.007M) for Government wide Rescission.

(U) Schedule: Not Applicable.

(U) Technical: Proceed with the advanced development of technologies as identified in Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology.

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Adv. Submarine Systems Dev. - S2033	**41.009**	**47.642**	**49.457**							
Adv. Metal Fiber Brushes - S2756	**2.221**	**2.972**	**0.000**							

A. (U) Mission Description and Budget Item Justification: This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible.

(U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for the VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The Program also supports two Information Exchange Programs with the United Kingdom, (one on submarine electromagnetic silencing and the second on submarine platform equipment, systems, and hull technology); operates the Large Scale Vehicle (LSV) to provide at-sea test capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the Hydrodynamic/Hydroacoustic Technology Center to enhance the Navy's ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; operates and supports the Intermediate Scale Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the program is constructing a second large scale vehicle, LSV2.

U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric motors and generators.

(U) This Program has been structured to support near term Virginia Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Advanced Submarine Sys Dev/0603561N**	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

(U) Program Accomplishments and Plans:

1. (U) FY 2000 Plan:

- (U) ($8.007M) Stealth: Continue development of advanced submarine propulsor technologies, internal transmission paths, Stealth Master Plan, Advanced Electromagnetic Silencing, hull radiation and echo formation (Advanced Coatings), Advanced Launchers and the Malice Program.
- (U) ($11.403M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hyrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete demonstration/validation of the Advanced Sail on LSV. Initiate Composite Sail development. Continue Rim Driven Thruster/Main Seawater Pump development .
- (U) ($.220M) SSM Master Plan: Complete development of the Structures, Survivability and Materials Primer and Technology needs document.
- (U) ($17.493M) Infrastructure: Continue operations and support for the Large Scale Vehicle, H/HTC, ISMS, R&D submarine. Continued design and construction of LSV 2.
- (U) ($3.440M) Total Ownership Cost/Affordability: Initiate Peel and Stick Damping study, initiate design and testing of Advanced Metal Fiber Brushes technology ($2.2M funding under Project Unit S2756).
- (U) ($2.667M) Continue Mission and Future Design (M&FD)/Hull, Mechanical and Electrical (HM&E) Conform Studies and New Technology Assessment support.

_____

$43.230M TOTAL ($41.009 + $2.221)

2. (U) FY 2001 Plan:

- (U) ($17.239M) Stealth: Continue development of submarine portions of corporate Electric Drive, advanced submarine propulsor technologies, internal transmission paths, Stealth Master Plan, Advanced Launchers, Advanced Electromagnetic Silencing, and hull radiation and echo formation (Adv. Coatings).
- (U) ($7.035M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete Rim Driven Thruster/Main Seawater pump development.

)

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Advanced Submarine Sys Dev/0603561N**	Advanced Sub Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

2. (U) FY 2001 Plan (continued)

Complete Advanced Sail development. Continue Advanced Composite Sail development.

- (U) ($18.120M) Infrastructure: Continue operations and support for the Large Scale Vehicle, Hydroacoustic/Hydrodynamic Test Center(H/HTC), Intermediate Scale Measurement System (ISMS), R&D Submarine. Complete design and construction of the LSV 2. Initiate acceptance trials.
- (U) ($3.565M) Total Ownership/Affordability: Continue development of Advanced Metal Fiber Brushes ($2.972M from S2756).
- (U) ($4.097M) Continue study and initiate demonstration for Payloads in compliance with Defense Science Board Report recommendations. Continue M&FD/HM&E Conform Studies and New Technology Assessment support.
- (U) ($.558M) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

$50.614M TOTAL ($47,642 + $2,972)

3. (U) FY 2002 Plan

- (U) ($17.958M) Stealth: Continue development of submarine unique portions of corporate Electric Drive, advanced submarine propulsor technologies, internal transmission paths, Stealth Master Plan, Advanced Electromagnetic Silencing, and hull radiation and echo formation (adv. coatings).
- (U) ($6.096M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Continue Composite Sail.
- (U) ($15.773M) Infrastructure: Continue operations and support for the Large Scale Vehicle, Hydroacoustic/Hydrodynamic Test Center(H/HTC), Intermediate Scale Measurement System (ISMS), R&D Submarine. Complete acceptance trials of LSV 2 for IOC.
- (U) ($2.743M) Total Ownership/Affordability: Initiate full scale land based testing of Advanced Metal Fiber Brushes.
- (U) ($6.887M) Continue study and demonstrations for Payloads in compliance with Defense Science Board Report recommendations. Continue M&FD/HM&E Conform Studies and New Technology Assessment support.

$49.457M TOTAL

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Advanced Submarine Sys Dev/0603561N**	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

B. (U) Other Program Funding Summary: additional $50M of SEALIFT National Defense Funds was appropriated in FY97, authorized in FY98 for LSV development.
(U) Related RDT&E: Not applicable.

C. (U) Acquisition Strategy: Not applicable.

D. (U) Schedule Profile:

	FY 2000	FY 2001	FY 2002
PROGRAM MILESTONES	Completed demonstration/validation of advanced sail on LSV, transition to VIRGINIA class PE. Hydroacoustic/Hydrodynamic Test Center computer refresh upgrade. Acoustic Research Detachment Range upgrade (phase 1). Initiated composite advanced sail development.	Launching of LSV 2. Troubleshoot SEAWOLF Acoustic issues LSV 1. Complete Rim Driven Thruster/ main seawater pump development. Issue Stealth Master Plan. Terminate Flow Mgmt. Complete Adv. Sail development, transition to VIRGINIA class. Initiate lemtep launcher cost feasability study. Initiate SSTG signature dev. Select composite adv. Sail vendor. Peel & stick transition. Electro-magnetic Silencing reprogramming. Develop advanced hull treatment plan. Transition dynamic bulk modules measurement system.	Initiate propulsor rapid prototype design developmnts. Initiate Advanced Maneuvering and Control development. SEAWOLF steel sail trail, LSV 1. VIRGINIA 4th generation propulsor trail.
ENGINEERING MILESTONES	Complete construction of LSV 2 modules. Assemble LSV 2 modules at Lake Pend Oreille. Initiate prototype design of flow mgmt.	LSV 2 acceptance and characterization trials. Initiate electric drive development. Complete upgrade/replace LSV range acoustic array.	LSV 2 RAV install Hull treatment on Sail. ITP Mount down select development.

EXHIBIT R-2a, RDT&E Project Justification — **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Advanced Submarine Sys Dev/0603561N**	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

	FY 2000	FY2001	FY 2002
ENGINEERING MILESTONES	Install replacement battery in LSV 1. Complete development of Stealth Master Plan. Concept for LSV evaluation Maneuvering design and analysis tool at H/HTC.	Continue advanced mount design, mount analysis test flanking path, shock analysis. SSN 22 coating characterization. Malice report & trial peel & stick. Malice full scale mock up test. Conduct composite Advanced Sail vendor qualification. Install Propulsor Design and analysis tool at H/HTC	
T&E MILESTONES	Complete EES 2nd generation disk life cycle aging test. Completed hydroacoustic evaluation of Advanced Sail prototype on LSV 1. Weapons effect testing of advanced decks and mounts. Conduct EES warfare effectiveness analysis. Completed hydroacoustic evaluation of LSV 1 with no sail. Demonstrate commutator operation for Adv. Metal Fiber Brushes - lab scale.	Intermediate scale land based testing for Advanced Metal Fiber Brushes. Complete EES warfare effectiveness analysis. If continued development is warranted, design mod to ASLF. Electro-magnetic Silencing US/UK sea trial - 8 and analysis. SSN 22 characterization sea- trial. Complete "no sail" trails LSV-1.	Demonstrate commutator operation for Advanced Metal Fiber Brushes - full scale. Electro-magnetic silencing US/UK sea trial - 9 Intermediate scale sea trials for brushes.
CONTRACT MILESTONES		Accept delivery of LSV 2 to Navy. Advanced Metal Fiber Brushes completion contract award.	
	43230	50614	49457

R-1 SHOPPING LIST - Item No. 59

Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001						
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NAME AND NUMBER								
RDT&E, N/BA-4		**Advanced Submarine Sys Dev/0603561N**				Advanced Submarine Systems Development/S2033								
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date					
Systems Engineering	S/CPFF	NNS Newport News, VA	42.201	1.249	02/00	1.169	12/00	1.500	12/01					
Systems Engineering	S/CPIF	NNS Newport News, VA	11.267	3.215	02/00	3.949	12/00	10.200	12/01					
Systems Engineering	S/CPFF	EB Groton, CT	47.876	0.830	02/00	1.800	12/00	4.500	12/01					
Systems Engineering	WR	NSWC Bethesda, MD	135.015	17.047	10/99	14.550		15.294						
Systems Engineering	S/CPFF	ARL/PSU, State College,PA	31.724	1.673	01/00	1.524	12/00	4.000	12/01					
Systems Engineering	S/CPFF	APL/JHU	0.100	0.250	04/00	0.200	01/00							
Systems Engineering	WR	NUWC Newport, RI	69.628	1.664	10/99	1.000		1.230						
Systems Engineering	WR	NRAD San Diego, CA	0.400	0.260	11/99	0.300								
Systems Engineering	S/CPFF	KAPL Schenectady, NY	2.000	3.000		9.700								
Systems Engineering	S/CPFF	Cortana	1.400	1.780		0.000		0.000						
Systems Engineering	S/CPFF	NOESIS		2.221		2.972								
Subtotal Product Development			341.611	33.189		37.164		36.724						

Remarks:

EB's PY cost is greater than total value of contract due to a new contract award.

Development Support Equipment														
Software Development														
Training Development														
Integrated Logistics Support														
Configuration Management														
Technical Data														
GFE														
Subtotal Support			0.000	0.000		0.000		0.000						

Remarks: Not applicable.

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4** | PROGRAM ELEMENT: **Advanced Submarine Sys Dev/0603561N** | PROJECT NAME AND NUMBER: Advanced Submarine Systems Development/S2033

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date					
Developmental Test & Evaluation	WR	NSWC Bethesda, MD	17.676	5.653	10/99	2.983		9.043						
Developmental Test & Evaluation	S/CPFF	NNS Norfolk, VA	1.817	1.663	02/00	4.000	12/00	2.000	12/01					
Developmental Test & Evaluation	S/CPFF	EB Groton, CT	17.706	1.097	02/00	1.800	12/00	1.000	12/01					
Developmental Test & Evaluation	S/CPFF	DARPA Fairfax, VA	3.000	0.000		0.540		0.000						
Developmental Test & Evaluation	S/CPFF	NOESIS	1.200	0.511		2.972		0.000						
Developmental Test & Evaluation	S/CPFF	SPA	0.410	0.547		0.600		0.000						
Subtotal T&E			41.809	9.471		12.895		12.043						

Remarks:

Contractor Engineering Support	S/CPFF	NNS Norfolk, VA	1.700											
Contractor Engineering Support	S/CPFF	EB Groton, CT	1.700											
Travel				0.080		0.080		0.090						
Contractor Financial Support		Vredenburg		0.090	11/99	0.060	11/00							
Government Engineering Support	WR	NSWC Bethesda, MD	1.000											
Contractor Engineering Support		Rosenblatt		0.175	12/99	0.190	12/00	0.200	12/01					
Contractor Engineering Support		JJMA		0.120	02/00	0.120	11/00	0.400	11/01					
Contractor Engineering Support		AME		0.105	12/99	0.105	11/00							
Subtotal Management			4.400	0.570		0.555		0.690						

Remarks: FY00 &01 includes congressional plus-up funds project unit S2756 for Metal Fiber Brushes in which all funds go to Noesis.

Total Cost			387.820	43.230		50.614		49.457						

Remarks:

EXHIBIT R-2a, RDT&E Project Justification										DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**76.640**	**66.569**	**61.309**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible.

(U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sonar and combat control systems improvements. The program addresses technology challenges that marginalize tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battlespace preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware / software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Specific technology areas include transducers, hull and towed arrays, monostatic and bistatic sonar signal processing, net-centric warfare, target motion analysis (TMA), Environmental Intelligence, multiple contact processing. Program office supports twelve international information exchange agreements. Program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) Program Accomplishments and Plans:

FY 2000 Accomplishments (V0223):
-($8.200) Advanced Tactical Control – Began development of Advance Processing Build-01 (Tactical) (APB(T)-01) software. Further defined functional priorities and initiated development of 3D tactical scene rendering, improved use of ARCI data and integrated vulnerability information management. Developed performance quantification metrics and data collection, storage and analysis methodologies. Completed development SFMPL 6.1 Initiated developement of tools to address close encounter requirements. Identified potential information management solutions including enviromental tools, cooperative Common Tactical Decisions Aids from DARPA, ONR, industry and academia. Initiated evaluation for inclusion in APB(T) Builds.

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EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**76.640**	**66.569**	**61.309**							
RDT&E Articles Qty										

FY2000 Plan (V0223) - Cont'd

- ($32.114) Advanced Sonar System and Processing – Completed APB(A)-99 sea test and transitioned to ARCI Phase III. Completed development of APB(A)-00 and initiated verification testing. Initiated definition and development of APB(A)-01 for low frequency vulnerability. Continued development of APB(A)-01 for mid and high frequency. APB improvements included enhanced automation for detection and claissifcation, and enhanced localization functionality.
- ($5.711) Advanced Towed Arrays - Continued 3-line array development. Continued fabrication of 1-line array. Developed NTMLTA signal processing design. Conducted1-line lake test and Critical Item Tests.
- ($10.800) Advanced Hull Arrays – Continued development of CAVES technology. Performed analysis on CAVES pre-patch test data. Installed CAVES Patch arrays USS Newport News. Conducted Post-patch DMP Sea Test. Investigated current coatings CAVES performance. Continued planning for integration of CAVES technology with other Hull arrays. Performed CAVES Outer decoupler buckling experiment. Continued documentation of CAVES program. Investigated impact of outer decoupler on inner decoupler. Initiated CACTISS III test planning. Initiated CAVES WAA transition planning. Initiated Bow Conformal array technology in conjunction with Advanced Sail to maintain current capability. Initiated Integrated Bow Conformal Array technology to replace spherical array, HF sail array, and HF chin array. Extended Noise Audit Model for Integrated Conformal Array. Initiated planning for FY04 Lake Test/Demonstration and FY05 Sea Test/Demonstration. Designed Bow Dome for demonstration tests. Initiated sensor development. Initiated acoustic source development. Initiated processor software development.
- ($6.700) High Frequency Sonar Program - Completed development, evaluation, testing and implemented APB99 Build 2+ into ARCI program. Completed Test bed upgrades. Continued sail and conformal array studies. Initiated investigation of HF bow conformal requirements, design trade-offs and planning efforts. Continued processing improvements including PUMA for APB 01 bottom and target mapping, ASW improvements, bottom tracking and navigation, and adaptive signal design. Initiated PUMA processing improvements into LMRS precision mapping efforts.
- ($.500) Test and Evaluation – Conducted Towed Array lake test. Continued at-sea data gathering program. Initiated planning for HF APB Sea Test.
- ($12.615) Fiber Optic Technology Transition - Risk reduction to assure smooth transition to VIRGINIA CLASS Submarine Program.

$76,640 TOTAL

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**76.640**	**66.569**	**61.309**							
RDT&E Articles Qty										

U) FY 2001 Plan (Proj S0223 (denoting new PEO)):
-($7.215) Advanced Tactical Control – Complete APB(T)-01 development which is focused on close encounter requirements. Conduct combat system performance assessment based on the defined metrics. Evaluate candidate technologies for APB(T)-02. Deliver SFMPL 6.1.
- ($33.132) Advanced Sonar System and Processing -Complete performance assessment and transition of APB(A)-00 to BQQ -10 project and VIRGINIA. Complete development, and intiate testing and transition of APB(A)-01 for low frequency. Complete development and intiate testing and transition of APB(A)-01 for mid and high frequency. Initiate APB(A)-02 to address inital acoustic scene management functionality including matched field techniques, new tracking, and automated passive operator search support.
- ($3.800) Advanced Towed Arrays- Continue 3-line array development. Conduct subsystem CITs. Fabricate 3-line array ADM. Fabricate 3-line signal processor ADM. Conduct system integration & testing.
- ($6.100) Advanced Hull Arrays- Continue development of CAVES technology - Complete installation of CAVES Patch array on USS NEWPORT NEWS (SSN 751). Conduct installation of CAVES Patch instrumentation. Conduct CAVES Patch test. Begin analysis of CAVES Patch Test. Continue documentation of CAVES program. Conduct CACTISS III test. Conduct planning for installation of CAVES Large Vertical Aperture (LVA) sonar on VIRGINIA hull 05 instead of CAVES WAA. Continue Noise Audit Model for Integrated Bow Conformal (IBC) Array and LVA. Conduct modeling of CAVES LVA performance. Begin modeling of Integrated Bow Conformal notional array performance. Construct 1/4 scale bow dome for material, beamforming, and self noise testing. Conduct material testing for inner decoupler use in CAVES LVA and IBC. Continue processor software development. Continue planning for demonstration test.
- ($5.700) High Frequency Sonar Program- Continue processing improvements including PUMA, evaluation and testing of APB01 initiatives. Continue investigation of HF bow conformal requirements, design trade-offs, and planning eforts. Transition on-going processing developments to advance processing. Continue PUMA processing improvements into LMRS precision mapping efforts. Initate PUMA/TEDS/MEDAL integration.
- ($9.000) Payloads/Sensors Program- Initiate a cooperative Navy/DARPA effort to identify and assess emerging technology concepts that will provide significant operational payoff within the context of curent and future submarine missions consistent with Navy strategic concepts.
- ($.500) Test & Evaluation - Conduct APB(T) -01 sea tests, HF sea tests, and hull array testing.
- ($1.122M) Portion of extramural program reserved for Small Business Inovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**76.640**	**66.569**	**61.309**							
RDT&E Articles Qty										

FY 2002 Plan (S0223):
- ($8.500) Advanced Tactical Control – Conduct APB(T)-01 Sea Test. Incorporate APB(T)-01 upgrades based on at-sea test and transition to CCS MK2 and VIRGINA Class Program for system level integration. Complete Development and Sea Test of APB(T)-02 , focusing on high density contact management and integration of non acoustic sensors.
- ($33.089) Advanced Sonar System and Processing – Complete transition of APB(A)-01 to BQQ-10 program and VIRGINIA. Complete development and initiate and transition test of APB(A)-02 to BQQ-10 and VIRGINIA program. Initiate definition/development of APB(A)-03 for follow-on acoustic scene management functionality including active intercept, TSMS, integrated active and passive processing, torpedo DCL, ACINT 21and improvements automated alertment, contact localization and tracking and sonar tactical decision aids.
- ($.770) Advanced Towed Arrays - Conduct 3 line R/V sea test. Conduct 3 line submarine demonstration. Perform 3 line data analysis.
- ($2.200) Advanced Hull Arrays - Complete CAVES Large Vertical Array (LVA) transition to VIRGINIA, update noise audit model. Complete LVA optimization study. Continue integration of CAVES technology into advanced broad frequency coverage, large horizontal and vertical aperture flank and bow sonar concept development. Continue development of noise audit model for Integrated Bow Conformal (IBC) Array. Complete 1/4 scale bow dome testing. Continue IBC Dome structure and array design. Complete CACTISS III test data analysis and issue report. Conduct Broadband active sonar demonstation in conjunction with High Frequency Sonar Program.
- ($4.400) High Frequency Sonar Program-Transition processing improvement, including PUMA, into APB 02. Continue improvements of HF passive and LPI active. Complete investigation of HF bow conformal requirements. Continue PUMA LMRS improvements efforts. Continue PUMA/TEDS/MEDAL integration.
- ($11.850) Payloads/Sensors Program- Continue cooperative efforts to identify, define, assess and evaluate emerging sensor and payload concepts for potential to provide significant operational benefit. Determine the development and transition path to bring technologies to the future submarine combatants.
- ($.500) Test & Evaluation - Conduct APB(T) -01 sea tests, HF sea tests, and hull array testing. Conducted Towed Array APB lake test. Continued at-sea data gathering program. Initiated planning for HF APB Sea Test.

$61.184 TOTAL

EXHIBIT R-2a, RDT&E Project Justification							DATE:	**June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**76.640**	**66.569**	**61.309**							
RDT&E Articles Qty										

B. (U) Other Program Funding Summary: Not applicable.

(U) Related RDT&E: Not applicable.

C. (U) Acquisition Strategy: Plan to use competitively awarded contracts from Board Agency Announcement (BAA) solicitations.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Advanced Submarine Dev/0603561N**				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**76.640**	**66.569**	**61.309**	**59.115**	**61.190**	**53.401**	**59.600**	**60.933**	**CONT.**	**CONT.**
RDT&E Articles Qty										

D. (U) Schedule Profile:

	FY 2000	FY 2001	FY2002
Program Milestones	4Q - SFMPL 6.1 Complete 3Q -APB(A)-99 & HF APB99 transition	1Q - HF Transition to PUMA/APB(A) - 01 2Q - APB(A)-00 Transition 2Q - APB(A)-01 LF Transition 4Q - CAVES LVA Transition Decision	1Q - APB(A/T)-01 Transition 4Q - APB (A)-02 Transition Initiated
Engineering Milestones	1Q - Initiate APB(A)-01 LF 3Q - Complete APB(A)-00 Dev. 1Q - Initiate APB(T)-01 4Q -3-line MLTA CDR	1Q - Deliver SFMPL 6.1 1Q - Initiate APB(A)-02 3Q - MLTA System Integration	1Q - Initiate APB(T)-02 4Q - IBC Bow Structure Design Complete 3Q - APB(A)-03 initiated
Test & Evaluation Milestones	3Q - HF APB99 Sea Test 3Q - APB(A)-99 Sea Test 4Q - Initiate APB(A)-00 Test	4Q - CACTISS III Test 4Q - CAVES Patch Sea Test 4Q HF APB 01 Sea Test 4Q - APB(A/T)-01 Test 3Q - 3-line MLTA Self Noise Test	1Q - HF Transition 3Q - CACTISS III Final Report 3Q - CAVES Patch Final Report 3Q - 3 BB Active Sonar Test 4Q - Complete 1/4 scale bow dome Test 2Q - 3-line MLTA Sea Test 3Q - APB(A)-02 Test Complete 4Q - APB(T)-02 Sea Test

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Advanced Submarine Sys Dev/0603561N**			PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Product Development	WR	NUWC Newport, RI	0.000	23.148	10/99	20.417	10/00	18.508	10/01			
Product Development	RCP	NUWC Newport, RI	0.000	0.500	04/00	0.500	-	0.500	-			
Product Development	WR	NRL/Washington	0.000	1.900	10/99	1.000	10/00	0.000	10/01			
Product Development	RCP	NRL/Washington	0.000	0.240	12/99	0.250	-	0.000	-			
Product Development	WR	NSWC Carderock, MD	0.000	5.082	10/99	2.750	10/00	1.250	10/01			
Product Development	RCP	NSWC Carderock, MD	0.000	0.036	12/99	0.000	-	0.000	-			
Product Development	WR	NCCOSC San Diego, CA	0.000	0.000	10/99	0.160	10/00	0.000	-			
Product Development	PD	ONI, Washington	0.000	0.735	06/00	0.183	12/01	0.150	12/02			
Product Development	C/CPFF	Lockheed-Martin,VA	0.000	3.371	11/99	3.250	-	3.000	-			
Product Development	C/CPFF	Sanders Assoc. (L-M),NH	0.000	0.902	11/99	1.000	11/00	0.750	11/01			
Product Development	RCP	NSMA	0.000	0.150	03/00	0.180	-	0.180	-			
Product Development	MIPR	U.S. Army/MITRE	0.000	1.740	12/99	1.750	12/00	1.750	12/01			
Product Development	MIPR	U.S. Air Force/MIT Lincoln Labs	0.000	1.500	12/99	1.000	12/00	1.000	12/01			
Product Development	RCP	ONR/MCCI/METRON	0.000	1.200	01/00	1.200	01/01	0.750	12/01			
Product Development	C/CPFF	Progeny, VA	0.000	0.400	11/99	0.750	-	1.000	-			
Product Development	C/CPFF	BBN, VA	0.000	0.810	12/99	0.500	-	0.000	-			
Product Development	RCP	ONR/GTRI	0.000	1.050	11/99	1.000	01/01	0.000	-			
Product Development	SS/CPFF	ARL/JHU, MD	0.000	6.895	12/99	5.500	01/01	6.000	01/02			
Product Development	SS/CPFF	APL/UW, WA	0.000	0.025	04/00	0.050	12/00	0.050	12/01			
Product Development	SS/CPFF	ARL/UT, TX	0.000	5.890	12/99	7.000	01/01	6.750	12/01			
Product Development	SS/CPFF	ARL/PSU, PA	0.000	0.825	12/99	0.350	12/00	0.350	12/01			
Product Development	MD	ARL/PSU, PA	0.000	0.357	01/00	0.150	01/01	0.185	01/02			
Product Development	WR	NAVAIR PAX/NSWC Indian H	0.000	0.040	01/00	0.000	-	0.000	-			
Product Development	WR	SPWAR, CA	0.000	0.206	10/99	0.200	10/00	0.200	10/01			
Product Development	C/CPFF	DSR, VA	0.000	4.500	12/99	4.500	12/00	5.000	-			
Product Development	C/CPFF	TWD Associate, VA	0.000	0.000	01/00	0.000	-	0.000	-			
Product Development	C/CPFF	Electric Boat, CT	0.000	5.603	01/00	0.000	-	0.000	-			
Product Development	CPFF	NNS, VA	0.000	0.000	01/00	0.000	-	0.000	-			
Product Development	MIPR	DARPA, VA	0.000	0.000	-	9.000	12/00	9.600	12/01			

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NAME AND NUMBER						
RDT&E, N/BA-4		**Advanced Submarine Sys Dev/0603561N**				Advanced Submarine Combat Systems Development/V0223/S0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
SBIRs / BAAs	C/CPFF	Various	0.000	5.584	Various	0.384	Various	1.291	Various			
Advanced Towed Array BAA	C/CPFF	Lockheed Martin, NY	0.000	1.315	12/99	0.000	-	0.000	-			
Product Development	Various	Various	0.000	0.811	Various	1.000	Various	1.000	Various			
Subtotal Product Development			0.000	74.815		64.024		59.264				
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000				
Remarks: This is a Non Acquisition Program which therefore includes no indirect support costs.												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Advanced Submarine Sys Dev/0603561N**			PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223/S0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Developmental Test & Evaluation	WR	NUWC Newport, RI	0.000	0.425	10/99	0.450	10/00	0.450	10/01			
Developmental Test & Evaluation	Various	Various	0.000	0.050	Various	0.050	Various	0.050	Various			
Operational Test & Evaluation												
GFE												
Subtotal T&E			0.000	0.475		0.500		0.500				
Remarks:												
Program Management Support	C/CPFF	Integrated Product Dec, CT	0.000	0.200	Various	0.250	Various	0.250	Various			
Program Management Support	C/CPFF	Stanley Associates, VA	0.000	0.900	12/99	1.750	12/00	1.250	12/01			
Program Management Support	Various	Various	0.000	0.200	Various	0.000	-	0.000	-			
Government Engineering Support												
Travel				0.050		0.045		0.045				
Overhead												
Subtotal Management			0.000	1.350		2.045		1.545				
Remarks:												
Total Cost			0.000	76.640		66.569		61.309				
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Submarine Tactical Warfare Systems/0603562N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	**4.352**	**4.317**	**5.405**							
Advanced Sub. Spt. Equipment/F0770	**2.141**	**2.444**	**3.328**							
Sub. Special Ops. Spt. Devel./V1739	**2.211**	**0.000**	**0.000**							
Sub. Special Ops. Spt. Devel./S1739 *	**0.000**	**1.873**	**2.077**							
Quantity of RDT&E Articles	**2**	**1**	**3**							

* Note: Due to re-alignment of Program Executive Office, FY2000 funds are allocated under V1739 and FY2001 and beyond funds will be allocated under S1739.

A. (U) Mission Description and Budget Item Justification: The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program (ASSEP) and the Submarine Special Operations Support Development Program. The overall objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D) and Electronic Warfare Support Measures (ES) technologies. The goal of the ASSEP is to increase submarine operational effectiveness through advanced R&D of Mast Signature Reduction (MSR), Sensors (RF, Visual IR etc.) and the electronic warfare technologies to enhance stealth, threat warning, strike and tactical surveillance. A continuing need exists to improve submarine capabilities in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. The Submarine Special Operations Support Development program responds to the increased threat of Naval activity in the Littorals and the continuing threat of submarine and surface ship activity in regions of the world through the development of advanced submarine R&D technology to provide improved operational capability in shallow water regions. Particular emphasis is placed in the areas of sonar operability and maintainability, Littoral operations, mine warfare, tactical surveillance, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic shallow water specific improvements for existing sonars, development of class specific Arctic operational guidelines and the testing of ice-capable submarine support structures. This program also provides the framework for various R&D programs to conduct Test and Evaluation in shallow water and Arctic regions.

B. (U) Program Change Summary: (show total funding, schedule, and technical changes for the program element that have occurred since the last submission).

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	4.667	4.356	5.401
Appropriated Value:	4.667	4.356	
Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:	-0.315	-0.039	0.004
FY 2002 PRES Budget Submit:	4.352	4.317	5.405

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Submarine Tactical Warfare Systems/0603562N

(U) Change Summary Explanation:

(U) Funding:

The FY 2000 decrease of ($-0.315M) is attributed to decreases of (-$0.024M) for an Across the Board Reduction, ($-0.071M) for Small Business Innovative Research (SBIR), (-0.220M) for various minor program adjustments. The FY2001 decrease of ($0.039M) is attributed to a decrease of (-$0.030M) for 0.7% pro-rata reduction and ($ 0.09M) for a government-wide recission. The FY2002 increase is attributed to ($0.004M) in minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Submarine Tactical Warfare Sys/0603562N**				PROJECT NAME AND NUMBER Advanced Submarine Support Equipment Program (ASSEP)/F0770					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**2.141**	**2.444**	**3.328**							
RDT&E Articles Qty	**0**	**0**	**1**							

A. (U) Mission Description and Budget Item Justification: This program develops submarine ES equipment and image processing technology. A continuing need exists to improve submarine capabilities in these areas to enhance operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ES and imaging to be effective in conducting the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. Specific efforts include development of Mast Signature Reduction (MSR) techniques (visual, IR and RCS), Sensor Technology, and ESM Technology. The program is divided into three catagories of projects MSR Technology Insertion Program (MSRTIP), Sensor Technology Insertions Program (STIP), and ES Technology Insertion Program (ESTIP). The MSRTIP evaluates the vulnerability of submarine masts, periscopes and sensors to visual, radar and infrared detection and evaluates the state of the art technology to implement periscope/mast engineering improvements to reduce the counter-detection threat. The STIP and ESMTIP programs develop submarine unique improvements to mast, periscope and hull mounted ES electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility demonstration models (FDMs) are developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing. STIP projects include: Radio frequency (RF) extensions; RF bandwidth improvements; passive localization; upgrades to the Imaging Mast sensors and software; and advanced antenna arrays for beam steering and high resolution direction finding enhancements. ESTIP projects include: improvements to signal sorting and recognition methods to support classification and identification of ESM contacts encountered during Littoral operations; signal processing improvements for processing of low probability of intercept signals; voice/ language recognition and human/ machine interface (HMI) enhancements. All programs funded in this project are non- acquisition category programs in accordance with Non-Acquisition Program Definition Document (NAPDD) # 556-872-872E1. The test articles identified consist of critical components of FDM's that will be fully developed during engineering development into Engineering Development Models (EDM's).

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Submarine Tactical Warfare Sys/0603562N**	Advanced Submarine Support Equipment Program (ASSEP)/F0770

(U) Program Accomplishments and Plans:

1. (U) FY 2000 Accomplishments:
- (U) ($ 0.275) Continue RCSR techniques and materials investigation.
- (U) ($ 1.075) Continue STIP development of Passive Surveillance Radar, Photonics Imaging Enhancement/ Auto Target Recognition and Tracking (started in FY98) and Photonics/Type 18 Low Band DF.
- (U) ($ 0.284) Continue ESTIP development of Counter Detection and Range Assessment.
- (U) ($ 0.507) Initiate ESTIP development of Combat Control System (CCS) interface for SSN 688 and Integrated Electronic Support (ES) Workstation.

2. (U) FY 2001 Plans:
- (U) ($ 0.280) Continue RCSR techniques and material investigation.
- (U) ($ 1.733) Continue STIP development of Passive Surveillance Radar,Photonics Imaging Enhancement/ Auto Target Recognition, Photonics/Type 18 Low Band DF and Advanced Shared Aperature Comms Antennas.
- (U) ($ 0.382) Continue ESTIP development of CCS Interface for SSN 688, Integrated ES Workstation and Counter Detection/Range Assessment.
- (U) ($ 0.049) Portion of extramural program reserved for Small Business Innovative research assessment in accordance with 15 USC 638.

3. (U) FY 2002 Plans:
- (U) ($ 0.300) Continue RCSR techniques and material investigation.
- (U) ($ 1.147) Continue STIP development of Passive Surveillance Radar, Photonics Imaging Enhancement/ Auto Target Recognition, Photonics/Type 18 Low Band DF and Advanced Shared Aperature Comms Antennas.
- (U) ($ 0.290) Initiate STIP development of Submarine Offboard ESM Sensors.
- (U) ($ 0.555) Continue ESTIP development of CCS Interface for SSN 688, Integrated ES Workstation and Counter Detection/Range Assessment.
- (U) ($ 0.236) Initiate ESTIP development of Communications Signal Onboard Trainer.
- (U) ($ 0.800) Estimated cost of one set of Feasibility Development Model (FDM) components.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Submarine Tactical Warfare Sys/0603562N**	Advanced Submarine Support Equipment Program (ASSEP)/F0770

B. (U) Other Program Funding Summary: Not applicable.
(U)Related RDT&E:
(U) PE 0604503N(Submarine System Equipment Development)
(U) PE 0604558N(New Design SSN Development)
(U) PE 0604777N(Navigation /ID Systems)

C. (U) Acquisition Strategy: This project will optimize technology insertion using a build-test-build approach to support ES operational needs. Operational needs have been based on 1999 COMSUBLANT/COMSUBPAC Command Capability Issues (CCIs), Virginia Class SSN Operational Requirements Document objectives, a review, assessment and prioritization of Sensor and Processor efforts and SSN force level projections for SSN688/688I and SSN21 classes through FY2015. The STIP and ESMTIP efforts will develop submarine unique improvements to mast, periscope and hull mounted ESM electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility Demonstration Models (FDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.

D. (U) Schedule Profile. See attached schedule.

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			**Sub Tactical Warfare Systems/0603562N**			Advanced Submarine Support Equipment Program (ASSEP)/F0770						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering	WR	NUWC Newport, RI	10.017	0.578	11/99	0.533	11/00	1.414	11/01			
Licenses												
Tooling												
GFE	N/A	N/A	0.000	0.000	N/A	0.000	N/A	0.000	Various			
Miscellaneous	Various	Various	8.057	1.316	Various	1.711	Various	1.728	Various			
Award Fees												
Subtotal Product Development			18.074	1.894		2.244		3.142				
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Engineering Technical Services	C/CPFF	GRCI, Mclean, Va.	0.931	0.058	11/99	0.030	11/00	0.030	11/01			
Technical Data												
GFE												
Subtotal Support			0.931	0.058		0.030		0.030				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **Sub Tactical Warfare Systems/0603562N**			PROJECT NAME AND NUMBER Advanced Submarine Support Equipment Program (ASSEP)/F0770							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000				
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Management Support Services	C/CPIF/CPA	Various	1.146	0.168	11/99	0.150	11/00	0.140	11/01			
Studies Analysis & Evaluations												
Travel	TO's	Various	0.145	0.021	10/99	0.020	10/00	0.016	10/01			
Labor (Research Personnel)												
Overhead												
Subtotal Management			1.291	0.189		0.170		0.156				
Remarks:												
Total Cost			20.296	2.141		2.444		3.328				
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**	PROGRAM ELEMENT NAME AND NUMBER **Submarine Tactical Warfare Sys/0603562N**				PROJECT NAME AND NUMBER Submarine Special Operations Support Development/V1739/S1739					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**2.211**	**1.873**	**2.077**							
RDT&E Articles Qty	**Arctic ex 2**	**Arctic ex 1**	**Arctic ex 2**							

A. (U) Misison Description an Budget Item Justification: This program responds to the increased threat of Naval activity in the Littoral and continuing threat of submarine and surface ship activity in all regions of the world throught the development of advanced submarine concepts. It places particular emphasis on submarine operability and mission support in unique environments. Efforts include assessment of combat system effectiveness, use of high frequency sonars in Arctic regions, testing of ice-capable submarine structures, and development of class specific Arctic shallow water operational guidelines. This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the shallow water and Arctic regions.

(U) Program Accomplishments and Plans

1. (U) FY 2000 Accomplishments
   - (U) ($2.011) Conduct/Support SCICEX 1-00 and ICEX 1-00
   - (U) ($0.200) Perform Structual Analysis for SSN 21 and Virginia Class Submarines

2. (U) FY 2001 Plans
   - (U) ($1.824) Conduct/Support Ice Exercise 1-01
   - (u) ($0.049) Portion of extramural program reserved for Small Business Innovative research assessment in accordance with 15 USC 638.

3. (U) FY 2002 Plans
   - (U) ($1.977) Conduct/Support ICEX and ICEOPS operations
   - (U) ($0.100) Perform SSN774 Structural Analysis

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Submarine Tactical Warfare Sys/0603562N**			PROJECT NAME AND NUMBER Submarine Special Operations Support Development/V1739/S1739						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering	WR	NSWC Carderock	1.470	0.100	11/99			0.100				
Systems Engineering		EB Corp		0.010	11/99							
Systems Engineering		NSWC INDIAN HEAD		0.051	01/00			0.030				
Systems Engineering		SPAWAR				0.020	01/01					
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			1.470	0.161		0.020		0.130				
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**		PROGRAM ELEMENT **Submarine Tactical Warfare Sys/0603562N**				PROJECT NAME AND NUMBER Submarine Special Operations Support Development/V1739/S1739						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Developmental Test & Evaluation	WR	SUBDEVRON Five	8.425	1.887	11/99	1.703	11/00	1.797	11/01			
Developmental Test & Evaluation	WR	CMDR,3rd NAVCON BRIGATE	0.050	0.050	01/00			0.050	10/01			
Developmental Test & Evaluation	WR	CMDR,2nd NAVCON BRIGATE				0.050	01/01					
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			8.475	1.937		1.753		1.847				
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support				0.128	11/99	0.090	11/00	0.090				
Travel				0.010	10/99	0.010		0.010				
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.138		0.100		0.100				
Remarks:												
Total Cost			9.945	2.211		1.873		2.077				
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**					R-1 ITEM NOMENCLATURE SHIP CONCEPT ADVANCED DESIGN, PE 0603563N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**31.995**	**5.115**	**1.949**						**Continuing**	**Continuing**
Design Tools, Plans & Concepts / S2196	**9.640**	**5.115**	**1.949**						**Continuing**	**Continuing**
Trident SSGN Conversion / F2759	**12.675**	**0.000**	**0.000**						**0.000**	**0.000**
Automated Maintenance Environment/22760	**9.680**	**0.000**	**0.000**						**0.000**	**0.000**
Quantity of RDT&E Articles	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		

A. (U) Mission Description and Budget Item Justification:

The efforts within this PE directly support the Navy's ability to design more affordable mission capable ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for ship concept studies, and the actual conduct of advanced design concept studies for the ships that may become part of the SCN plan. The program provides the foundation for affordable surface ship design, construction, and life cycle support and is a required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems.

(U) Project S2196 - This project funds advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria. FY 00 contains funds to develop a smart propulsor product modeling capability and Standards for Exchange of Product Model Data (STEP development - Navy CAE Technology).

(U) Project F2759 - This project funds TRIDENT SSGN design conversion efforts in FY 2000. PE 0604564N / S2610 funded FY1999 efforts. FY 2001 efforts are funded in PE 0603559N / S2413.

(U) Project 22760 - These projects fund development of an Automated Maintenance Environment (AME) for surface ships.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**	R-1 ITEM NOMENCLATURE SHIP CONCEPT ADVANCED DESIGN, PE 0603563N

B. Program Change Summary:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	28.659	0.162	2.968
(U) Appropriated Value:	28.659	5.162	
(U) Adjustments to FY2000/2001 Appropriated Value/FY2001 President's Budget:	3.336	4.953	-1.019
(U) FY 2002 President's Budget Submit:	31.995	5.115	1.949

(U) Funding: FY 2000 funding changes reflects Below Threshold Reprogrammings of $+1.050M for Smart Propulsor Product Model and $+3.000M for Trident SSGN Conversion, -$0.562M for SBIR, -$0.112M for Congressional Rescission, and -$0.040M other adjustments.
FY 2001 funding change is: $5M for Human Systems Integration for AME, -$.036M for .7% Congressional Pro-Rata reduction and -$.011M for other adjustments.
FY 2002 funding decrease is due to: -$0.968M for various adjustments, -$0.081M for NWCF rate adjustments and +$.030 other adjustments.

(U) Schedule: None

(U) Technical: Each on-going and future ship acquisition program individually will plan for and develop their needed engineering tools and methods for ship design and engineering done in the feasibility and ship design stages including certification of industry designs.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**	PROGRAM ELEMENT NAME AND NUMBER SHIP CONCEPT ADVANCED DESIGN, PE 0603563N				PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS & CONCEPTS / S2196					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005	FY 2006	Cost to Complete	Total Cost
Project Cost (S2196)	**9.640**	**5.115**	**1.949**						**Continuing**	**Continuing**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: The efforts within this project directly support the Navy's ability to design more affordable mission capable ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. This project directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for ship concept studies, and the actual conduct of design concept studies for the ships in that plan. This project provides the foundation for affordable surface ship design, construction, and life cycle support and is a required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design/construction and operational problems.

(U) This project accomplishes the following: (1) identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (2) investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (3) provides design methods and automated design tools to develop and evaluate ship concepts; and (4) supports development of Mission Need Statements (MNS) for future ships. These efforts are done to support mission analysis, mission needs development and technology assessment in support of future fleet concepts and potential ship acquisition programs. These efforts are foundational to the Navy's formulation of the future fleet.

(U) Efforts under Project S2196 transition directly to early stage ship design in PE 0603564N, Ship Preliminary Design and Feasibility Studies. While these efforts support concept exploration and mission needs assessment for potential future ship acquisition programs, they are not direct efforts for specific authorized shipbuilding programs. This project is the only R&D effort (Government or commercial) that supports and maintains this country's naval ship design and engineering capabilities in the area of very early stage (Concept Design) design tools, criteria, and methods.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($0.522) Pre-Milestone 0 Ship Concepts and Mission Need Analysis: Developed ship concepts and performed mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conducted pre-Milestone 0 ship concept studies for medical capabilities afloat, future mine countermeasures ships, and other potential ship concepts / configurations in support of SCN planning. Developed potential future fleet architecture concepts.

(U) ($0.400) Total Ship Technology Assessment: Analyzed the benefits and impacts of new ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identified, characterized and assessed new and emergent technologies and update the HM&E technology database. Supported integration and transition of new technologies in total ship concepts. Updated baseline ship concepts and technology attribute database for use in technology assessments. Supported development of total ship and HM&E technology roadmaps.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

(U) ($1.240) Ship Design and Engineering Tools, Methods, and Criteria. Improved capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improved surface ship synthesis/assessment models in the following areas: improved performance assessment capabilities, increased ability to handle alternative distributed system architectures, updated and enhanced capabilities to handle new ship configurations, hull form alternatives, signature reduction features, characterized advanced machinery technologies, addressed minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Improved interoperability of Navy and shipbuilder design systems. Continued development of interoperability standards and capability between and among: synthesis/assessment models, cost estimation models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Navy-developed analysis tools by participation in and support for collaborative efforts such as the Navy Industry Digital Data Exchange Standards Committee (NIDDESC) and the Maritech Advanced Shipbuilding Enterprise (ASE). Support NAVSEA Professor of Ship Production research grant.

(U) ($1.130) Simulation Based Ship Design & Engineering: Continued to adapt state-of-the-art visualization and simulation techniques for ship design and engineering applications. Reviewed pending ship design needs and ship technology developments to identify top priority simulation requirements. Acquired, validated, adapted, and implemented commercial visualization and simulation tools for the areas such as piping systems simulation and ergonomic models in crew reduction performance simulation. Validated and implemented visualization and simulation tools from DARPA, ONR, and other government sources for areas such as ship motions, maneuvering, powering, personnel flow, stores flow, structural response, command and communications systems, electric power systems, piping systems, HVAC systems, and combat systems. Developed custom visualization and simulation tools where no alternate source exists in areas such as signature visualization and simulation. Continued development of interoperability standards and capability between visualization and simulation tools, ship synthesis/assessment models and computer aided design (CAD) models.

(U) ($0.950) Reliability Based Structural Design Criteria: Began development of methodology for overall strength analysis of surface ships. Added new reliability inputs and assessment techniques to design rules. Incorporated methods for predicting extreme and cumulative lifetime loads into design rules. Collected and analyzed long-term hydrodynamic loads data. Correlated full scale loads measurements with model test results. Validated and adapted advanced seaway loads prediction methods for use with design rules. Developed methodology for bow form effects on hull loads. Established safety indices for naval ship structures components (unstiffened and stiffened plates). Continued performing large scale grillage strength tests. Assessed grillage strength test data. Updated design data sheet for compressive strength of plating stiffeners and grillages. Began integration of all four parts of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Validated processes and utilized technologies/improved design methods on existing ships and new designs. Supported transition to industry through the Ship Structure Committee (SSC).

(U) ($0.870) Total Ownership Cost Methods and Modeling: Developed total ownership cost modeling and cost decision making tools for ships. Supported Navy-Shipbuilding Industry cost model development team. Enhanced the PODAC cost model capability to incorporate separately estimated cost for specific or special systems. Executed development plan for risk and schedule capabilities of PODAC cost model. Collected and analyzed cost data of shipbuilders for development of activity based cost estimation factors. Continued to develop PODAC cost model estimating ratios for shipbuilding interim products, parametric scaleable systems, and shipboard equipment for ships. Developed cost estimation ratios for world class shipbuilding processes and practices and for new ship production processes, technologies, and materials. Continued integration of operating and support (O&S) cost modeling and analysis capabilities. Developed O&S cost estimating ratios for naval ships through analysis of Visibility And Management of Operating and Support Costs (VAMOSC) and other historical O&S databases. Continued work on design data analysis module to link PODAC with computer-aided ship design tools.

(U) ($2.579) Smart Propulsor Product Model efforts. Developed a smart computer product modeling capability for naval ship propulsors.

(U) ($1.949) Standards for the Exchange of Product Model Data.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

(U) FY 2001 PLAN:

(U) ($0.161) Ship Concept Design and Engineering Tools, Methods, and Criteria. Improve capability for rapid and accurate ship tradeoff studies using surface ship synthesis/assessment models.
(U) ($4.954) Automated Maintenance Environment

(U) FY 2002 PLAN:

(U) ($0.389) Ship Concepts and Mission Need Analysis: Develop ship concepts and perform mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone A ship concept studies for potential ship concepts / configurations in support of SCN planning. Assess the future ship concepts as part of potential future fleet architecture concepts.

(U) ($0.195) Total Ship Technology Assessment: Analyze the benefits and impacts of new ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and assess new and emergent technologies. Support integration and transition of new technologies in total ship concepts. Support development of total ship and HM&E technology roadmaps.

(U) ($1.365) Ship Concept Design and Engineering Tools, Methods, and Criteria. Improve capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve surface ship synthesis/assessment models in the following areas: improve performance assessment capabilities, update and enhance capabilities to handle new ship configurations, hull form alternatives, signature reduction features, characterize advanced machinery technologies, address optimal required shipboard manning, reduced total ownership cost , and increased capabilities to determine ship size impacts of new technologies. Improve interoperability of Navy and shipbuilder design systems. Continue development of interoperability standards and capability between and among: synthesis/assessment models, cost estimation models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Navy-developed analysis tools by participation in collaborative efforts such as the Navy Industry Digital Data Exchange Standards Committee (NIDDESC) and other shipbuilding technology efforts. Support NAVSEA Professor of Ship Production research grant.

B. Other Program Funding Summary: Not applicable.
(U) Related RDT&E

(U) PE 0603512N (Carrier Systems Development)
(U) PE 0603513N (Shipboard Systems Component Development)
(U) PE 0604300N (SC21 Total Ship Systems Engineering)
(U) PE 0603564N (Ship Preliminary Design and Feasibility Studies)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

C. Acquisition Strategy:
This is a non acquisition program that develops, demonstrates, evaluates, and validates early stage total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for these concept designs and assessments.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**	PROGRAM ELEMENT NAME AND NUMBER SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS & CONCEPTS / S2196	

D. Schedule Profile

	FY 2000	FY 2001	FY 2002
Program Milestones	(Not applicable - Non-Acquisition Program)		
Engineering Milestones (All are 4th Quarter unless otherwise indicated)	Complete Medical Capability Afloat Study		
	Complete LHA (large deck amphibious assault) Dev. Options Study including ship concept studies 1Q		
	Define interface specifications for analysis programs to CAD systems & ship synthesis models	Complete ship synthesis model tool user interface upgrade 1Q	Ship synthesis model tool interface to major operational assessment tool
	Fracture & grillage tests of shipyard fabrication specimens complete	Publish Load Factor Resistance Design Method Application and Basis	Merge capabilities of alternative ship synthesis model tools
	Safety indices for naval ship structures components (unstiffened and stiffened plates)		
	Develop initial life cycle cost estimating capabilities		
	PODAC Cost Model Version 6		
Testing Milestones	(Not applicable - Non-Acquisition Program)		
Contract Milestones	(Not applicable - Non-Acquisition Program)		

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS, AND CONCEPTS, S2196

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering,	C/CPFF	CSC Adv Marine (CSC- AM) Arlington, VA	6.794	0.269	Note (1)					Cont.	Cont.	N/A
Concept Development, Engineering Development, Demonstration & Evaluation	C/CPFF	SPAR Assoc, Annapolis, MD	1.450	0.550	Note (2)					Cont.	Cont.	N/A
		Bird-Johnson, Walpole, MA	0.000	1.126	Dec. 2000					1.126	1.126	1.126
	various	Other Contractors	43.566	0.100	various	0.000	various	0.000	various	N/A	N/A	N/A
	WR	NAVSEA, Carderock Div, West Bethesda, MD	23.665	3.683	N/A	0.151	N/A	1.889	N/A	N/A	N/A	N/A
	WR & RC	Other Govt. Activities	7.912	0.510	N/A	0.010	N/A	0.060	N/A	N/A	N/A	N/A
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			83.387	6.238		0.161		1.949		Cont.	Cont.	

Remarks: Note (1): Existing Contract awarded April 1995. Modifications award 1st quarter of FY.
Note (2): Existing Contract awarded March 1998. Modifications award 1st quarter of FY. This contract also includes Avondale Industries, New Orleans, LA; Bath Irons Works, Bath, ME; Ingalls Shipbuilding, Pascagoula, MS; NASSCO, San Diego, CA; Designers & Planners, Arlington, VA; and The University of Michigan Transportation Research Institute, Ann Arbor,MI

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		N/A	N/A	

Remarks:

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**			PROGRAM ELEMENT SHIP CONCEPT ADVANCED DESIGN, PE 0603563N			PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS, AND CONCEPTS, S2196						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	N/A	N/A	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel				0.000		0.000		0.000			N/A	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000	N/A	0.000	N/A	0.000	N/A	N/A	N/A	
Remarks:												
Total Cost			83.387	6.238		0.161		1.949		Cont.	Cont.	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**					R-1 ITEM NOMENCLATURE 0603564N/Ship Preliminary Design and Feasibility Studies					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**9.969**	**56.374**	**14.922**						**Continuing**	**Continuing**
Ship Feasibility Studies/S0408	**9.969**	**36.558**	**14.922**						**Continuing**	**Continuing**
Shipboard Simulation for USMC/22863	**0.000**	**19.816**	**0.000**						**0.000**	**19.816**
Quantity of RDT&E Articles	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		

A. (U) Mission Description and Budget Item Justification. Ship concepts, identified in PE 0603563N (Ship Concept Advanced Design) are transitioned to and further developed by this project after an approved Milestone A (MS A) decision. This project performs the Ship Feasibility Studies required to address a specific Mission Needs Statement (MNS) and supports the Analysis of Alternatives(AOA) for new surface ships in the Navy Shipbuilding Plan; performs impact studies of warfare, hull, mechanical and electrical subsystems on advanced ship designs; enhances ship/ship system design methodologies that support phase 0; develops and upgrades the engineering tools, especially ship synthesis models, used to support AOA studies and other engineering efforts accomplished during phase 0; evaluates advanced and alternative technologies and develops total ship concepts with these technologies to assess their suitability; develops the initial documentation and design methodology required by the government for the design of surface ships in the Shipbuilding Program in accordance with the requirements of the DoD 5000 directives/instructions; supports the development of the Operational Requirements Document (ORD) and other documentation required at Program Initiation and accomplishes other efforts for future ship acquisitions in support of a Program Initiation decision. Completion of this phase allows review and approval, at Program Initiation, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable alternatives.

B. (U) Description of Shipboard Simulation for Marine Corps Operations. Models and simulations of USMC operations and support are to be demonstrated and further developed as required by this project. This project will ensure interoperabilty between select amphibious ships and the embarked USMC forces in support of expeditionary warfare operations. Interoperability will be demonstrated through the use of modeling and simulation technology for pre-assault mission planning and rehearsals, just-in-time, embedded technical and tactical training of USMC forces afloat, cargo and munitions load out planning, cross-ARG, real time cargo visibility, survivability analysis and maritime logistics planning in support of Operational Maneuver From The Sea. Models will also enable operational planning for special operations such as humanitarian assistance and NEO missions. The use of modelling and simulation technology enables the avoidance of more costly and time consuming operational testing and evealuation. The objective is to maximize compataibility and interoperability between amphibious ships and USMC forces, and to maximize mission flexibility across various warfare areas.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**	R-1 ITEM NOMENCLATURE 0603564N/Ship Preliminary Design and Feasibility Studies/S0408

B. Program Change Summary

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	12.012	46.896	4.944
(U) Appropriated Value:	12.012	56.896	
(U) Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 Presidents Budget:	-2.043	9.478	9.978
(U) FY 2002 PRES Budget Submit	9.969	56.374	14.922

FY 2000 Changes consist of: -$1.175M Below Threshold Reprogramming update (May-00), -$.125M SBIR assessment, -$.576M Midyear adjustments and -$.167M minor adjustments.
FY 2001 Changes consist of: +$20.000M for Shipboard Simulation of USMC Operations, -$10.000M JCC(X) Analysis of Alternatives and -$.398M .7% Pro-Rata Reduction and -$.124M minor adjustments..
FY 2002 Changes consist of: +$10.000M JCC(X) Feasibility Studies and -$.022minor adjustments.

Schedule: Not applicable.

Technical: Not applicable.

EXHIBIT R-2a, RDT&E Budget Item Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT& E, NAVY/BA4**	PROGRAM ELEMENT NAME AND NUMBER SHIP PRELIMINARY DESIGN/FEASIBILITY STUDIES	R-1 ITEM NOMENCLATURE Ship Development (Adv)/S0408	

COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**9.969**	**36.558**	**14.922**						**Continuing**	**Continuing**
Quantity of RDT&E Articles	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		

A. (U) Mission Description and Budget Item Justification. Ship concepts, identified in PE 0603563N (Ship Concept Advanced Design) are transitioned to and further developed by this project after an approved Milestone A (MS A) decision. This project performs the Ship Feasibility Studies required to address a specific Mission Needs Statement (MNS) and supports the Analysis of Alternatives(AOA) for new surface ships in the Navy Shipbuilding Plan; performs impact studies of warfare, hull, mechanical and electrical subsystems on advanced ship designs; enhances ship/ship system design methodologies that support phase 0; develops and upgrades the engineering tools, especially ship synthesis models, used to support AOA studies and other engineering efforts accomplished during phase 0; evaluates advanced and alternative technologies and develops total ship concepts with these technologies to assess their suitability; develops the initial documentation and design methodology required by the government for the design of surface ships in the Shipbuilding Program in accordance with the requirements of the DoD 5000 directives/instructions; supports the development of the Operational Requirements Document (ORD) and other documentation required at Program Initiation and accomplishes other efforts for future ship acquisitions in support of a Program Initiation decision. Completion of this phase allows review and approval, at Program Initiation , to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable alternatives.

EXHIBIT R-2a, RDT&E Budget Item Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	R-1 ITEM NOMENCLATURE
RDT& E, NAVY/BA4	SHIP PRELIMINARY DESIGN/FEASIBILITY STUDIES	Ship Development (Adv)/S0408

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($9.969) Pre-Program initiation AOA, ORD developed and supported feasibility studies for a new Joint Command and Control (JCC(X)) ship.

2. (U) FY 2001 PLAN:

(U) ($20.486) Continue JCC(X) Feasibility Studies, AOA, ORD development and mission package and host platform definition. JCC(X) requirements development process. Prepare documentation required for a Program Initiation decision. Develop and upgrade engineering tools, especially ship synthesis models, that support this AOA study and the other engineering efforts accomplished during Phase 0, between Milestones A and Program Initiation.

(U) ($15.534) Begin pre-Program Initiation AOA, feasibility studies, and ORD Development for LHA Replacement ships. Develop and upgrade engineering tools, especially ship synthesis models, that support this AOA study and the other engineering efforts accomplished during Phase 0, between Milestones A and program Initiation.

(U) ($ 0.538) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

(U) ($10.000) Continue and complete JCC(X) Feasibility Studies, ORD development and mission package and host platform definition. Fund limited industry participation in JCC(X) requirements development process. Prepare documentation required for a Program Initiation decision. Develop and upgrade engineering tools, especially ship synthesis models, that support this Feasibility Study and the other engineering efforts accomplished during Phase 0, between Milestones A and Program Initiation.

(U) ($ 3.922) Continue and complete LHA Replacement Feasibility Studies. Prepare documentation required for a Program Initiation decision. Develop and upgrade engineering tools, especially ship synthesis models that support this AOA and other engineering efforts accomplished during Phase 0, between Milestone A and Program Initiation

(U) ($1.000) Initiate AOE-10 replenishment ship feasibility studies.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**	R-1 ITEM NOMENCLATURE 0603564N/Ship Preliminary Design and Feasibility Studies/S0408

C. (U) Other Program Funding Summary: Not applicable.

(U) Related RDT&E:
(U) PE 0603563N (Ship Concept Advanced Design)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

D. (U) Acquisition Strategy: Not applicable.
This is a non acquisition program that supports pre-Milestone I efforts for potential ship acquisition programs.

E. (U) Schedule Profile:

Program Milestones

FY 2000	FY 2001	FY2002
	3Q LHA Replacement MS A	4Q LHA Replacement Program Initiation 1Q JCC(X) Program Initiation

Engineering Milestones TBD - Milestone schedule is established at Program Initiation.

T&E Milestones See individual ship acquisition program documentation.

Contract Milestones See Individual ship acquisition program documentation.

Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E,N/4	Ship Prelim Design & Feasibility Studies/0603564N	Ship Development (ADV)/S0408

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering	WR	NSWC Dahlgren, VA	8.842	0.750	Various	2.420	Various	1.050	Various	Cont.	Cont.	N/A
	WR	NSWC Carderock, MD	0.000	1.480	Various	6.283	Various	1.095	Various	Cont.	Cont.	N/A
	WR	NSWC Panama City	0.000	0.000		1.300	Various			Cont.	Cont.	N/A
	PD	SPAWAR	0.000	3.030	Various	6.181	Various	2.008	Various	Cont.	Cont.	N/A
	PD	NAVAIR	0.000	0.000		0.800	Various	0.300	Various	Cont.	Cont.	N/A
	WR/Reqn	Other Government	10.558	0.000		1.614	Various			Cont.	Cont.	N/A
	C/CPFF	Nichols Adv Marine, VA	0.000	2.280	Various	8.923	Various	2.737	Various	Cont.	Cont.	N/A
	Comp	J.J. McMullen, VA	5.857	0.000	Various	0.172	Various					
	Various	Other Contractor	16.769	2.396	Various	8.755	Various	7.532	Various	Cont.	Cont.	N/A
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			42.026	9.936		36.448		14.722		Cont.	Cont.	N/A

Remarks:

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**			PROGRAM ELEMENT Ship Prelim Design & Feasibility Studies/0603564N			PROJECT NAME AND NUMBER Ship Development (ADV)/S0408						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel				0.033		0.110		0.200		Cont.	Cont.	N/A
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.033		0.110		0.200		Cont.	Cont.	N/A
Remarks:												
Total Cost			42.026	9.969		36.558		14.922		Cont.	Cont.	N/A
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE 0603573N/ADVANCED SURFACE MACHINERY					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**25.685**	**9.547**	**3.921**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
Advanced Surface Machinery/S1314	**23.755**	**5.556**	**3.921**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
Naval Ship Survivability/32761	**1.930**	**3.991**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
Quantity of RDT&E Articles										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Advanced Surface Machinery Programs develop affordable advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements.

(U) Project S1314- The ICR Gas Turbine Engine program, is a marine propulsion gas turbine. ICR will reduce life cycle fuel cost and provide an alternate prime mover candidate. A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation (now Northrop Grumman Marine Systems) in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves approximatelya 25% to 27% propulsion annual fuel savings when compared to the LM2500 on a mechanical drive ship.

(U) Project 32761 - The funding will be used to demonstrate advanced open system architectures and controls to further improve electrical power reliability to mission critical loads and further reduce platform costs.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA4**	R-1 ITEM NOMENCLATURE 0603573N/ADVANCED SURFACE MACHINERY

B. PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	26.581	5.635	8.579
(U) Appropriated Value:	26.727	9.635	
(U) Adjustment to FY 2000/2001Appropriated Value/			
(U) FY 2001 President's Budget:	-0.896	3.912	-4.658
(U) FY 2002 PRES Budget Submit:	25.685	9.547	3.921

FY 2000 Adjustments: -$0.611M SBIR assessment , -$0.104M Congressional Rescission, -$0.181M other reductions.

FY 2001 Adjustments: $4.000M Naval Ship Survivability, -$0.067M Economic Assumption, -$0.021M Congressional Recission .

FY 2002 Adjustments: -$4.600M ICR Essential Program and -$0.058M other reductions.

Schedule: ICR - No change. IPS program transitioned to P.E. 0603513N/Project 32471 in FY 2000.

Technical: IPS program transitioned to P.E. 0603513N/Project 32471 in FY 2000. In FY 2000, the ICR program transitioned the qualification portion of program to Allied countries for completion.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER ADVANCED SURFACE MACHINERY/PE 0603573N				PROJECT NAME AND NUMBER ICR-Gas Turbine Engine/S1314					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**23.755**	**5.556**	**3.921**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Continuing**	**Continuing**
RDT&E Articles Qty										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The ICR Gas Turbine Engine is a marine propulsion gas turbine. ICR will reduce life cycle fuel cost and provide an alternate prime mover candidate. A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves approximately a 25% to 27% propulsion annual fuel savings when compared to the LM2500 on a mechanical drive ship.

(U) ICR full scale system development testing began in July 1994 and completed at Pyestock, U.K. on 30 April 1999. An additional 457 hours of testing at NAVSSES Philadelphia which completed 16 December 1999, confirmed readiness for qualification testing. Recuperator recovery efforts continued following the failure in January 1995 of the initial recuperator. An Engineering Development Model (EDM) recuperator, which is the exhaust heat recovery unit that provides most of the fuel efficiency gains, was delivered to the test site in January 1999. Testing on this EDM has met expectations. System testing to date has completed over 1400 hours of successful testing including over 1150 hours with the second generation recuperator and 175 hours with the EDM recuperator. Tests to date have met objectives.

(U) A Cooperative Agreement between the United Kingdom (U.K.) and United States governments was signed by USD(A&T) on 21 June 1994 and revised in March 1997 and again in November 2000 for in-kind and cash contributions to the ICR program. A Cooperative Agreement between the French and United States governments was signed by ASN(RD&A) on 30 August 1995 and revised in October 2000 for in-kind and cash contributions to the ICR program.

(U) The FY 1999 funds for Integrated Power Systems (IPS) were budgeted and executed under P.E. 0603573N/Project S1314. IPS funding has transitioned to P.E. 0603513N/Project 32471 for both budget and execution in FY 2000 and out.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E,N/BA-4	**ADVANCED SURFACE MACHINERY/PE 0603573N**	**ICR-GAS TURBINE ENGINE/S1314**	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($23.755) ICR: The development test at NAVSSES, Philadelphia was completed on 16 December 1999. A final development Design Review called DR5 was conducted and completed 29 February 2000. Following this design review, the development portion of the "Essential Program" is complete. At that time, the joint U.S./U.K. and U.S./France programs were transitioned to U.K./France for management of the qualification program.

2. (U) FY 2001 PLAN:

(U) ($5.438) ICR: The Royal and French navies will perform the 3000 hour endurance qualification test, which will require approximately eighteen months. U.S. Navy responsibilities will include participation in the Steering Committee, technical review, monitoring tests and accepting test results for compliance to U.S. Navy requirements. The U.S. Navy will initiate closing the development testing portion of the contract with Northrop Grumman Marine Systems.

(U) ($0.118) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

(U) ($3.921) ICR: The Royal and French navies will continue execution of the 3000 hour endurance qualification test. U.S. Navy responsibilities will include participation in the Steering Committee, technical review, monitoring tests and accepting test results for compliance to U.S. Navy requirements.

B. (U) OTHER PROGRAM FUNDING SUMMARY: N/A

FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	TO COMPLETE	TOTAL COST

C. (U) ACQUISTION STRATEGY: ICR is a candidate system for DD-21.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **ADVANCED SURFACE MACHINERY/0603573N**	PROJECT NAME AND NUMBER **ICR-Gas Turbine Engine/S1314**

D. Schedule Profile:

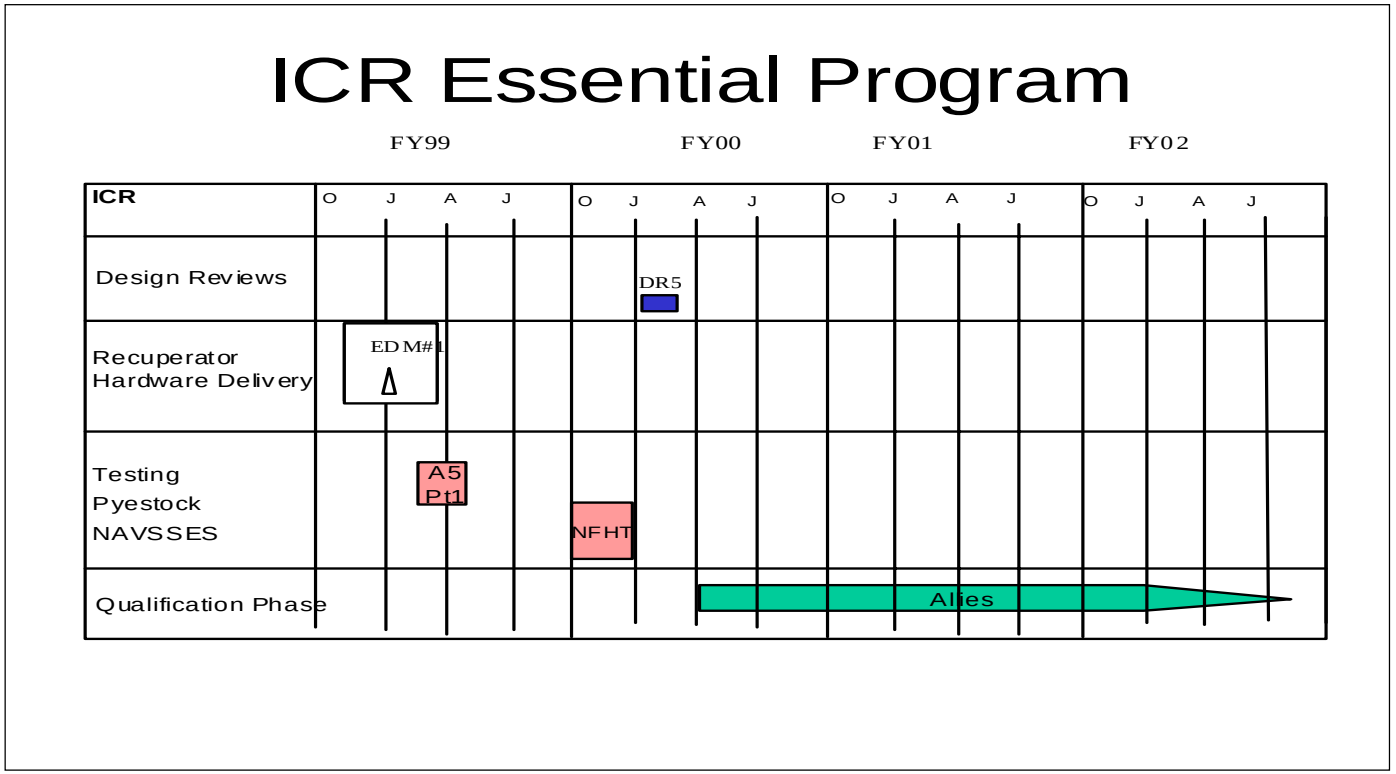

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA4**			PROGRAM ELEMENT **0603573N**			PROJECT NAME AND NUMBER **ADVANCED SURFACE MACHINERY/S1314**						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	NG, Sunnyvale, CA	322.422	12.592	Oct 99	4.106	Oct 00	2.871	Oct 01	Continuing	Continuing	
Ancillary Hardware Development										Continuing	Continuing	
Systems Engineering	C/CPAF	NG, Sunnyvale, CA								Continuing	Continuing	
	C/CPAF	Other Contractor	0.258	0.100	Oct 99	0.000	N/A	0.000	N/A	Continuing	Continuing	
Licenses										Continuing	Continuing	
Tooling										Continuing	Continuing	
Cost Improvement				7.000						Continuing	Continuing	
Award Fees	CC[AF	NG, Sunnyvale, CA	7.599	1.224	Apr 00					Continuing	Continuing	
Subtotal Product Development			330.279	20.916		4.106		2.871		Continuing	Continuing	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support												
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**		PROGRAM ELEMENT **0603573N**				PROJECT NAME AND NUMBER ADVANCED SURFACE MACHINERY/S1314						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Philadelphia, MD	10.950	2.789	Oct 99	1.400	Oct 00	1.000	Oct 01	Continuing	Continuing	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			10.950	2.789		1.400		1.000		Continuing	Continuing	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel				0.050	Various	0.050	Various	0.050	Various	Continuing	Continuing	
Labor (Research Personnel)												
Overhead												
Subtotal Management				0.050		0.050		0.050		Continuing	Continuing	
Remarks:												
Total Cost			341.229	23.755		5.556		3.921		0.000	0.000	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **JUNE 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4**					R-1 ITEM NOMENCLATURE **Combat Systems Integration 0603582N**					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY2007	Cost to Complete	Total Cost
Total PE Cost	**76.800**	**54.461**	**42.915**						**Cont.**	**Cont.**
Combat Systems Integration S0164	**76.800**	**54.461**	**42.915**						**Cont.**	**Cont.**
Quantity of RDT&E Articles	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

A. Mission Description and Budget Item Justification: COMNAVSEASYSCOM (SEA 53) was assigned central responsibility for interoperability by CNO MSG DTG 021648Z May 1998 to develop policy and architecture for Battle Force warfare systems engineering, implement a common warfare systems engineering process and provide top level direction for fielding and support of balanced combat systems for ships and submarines. SEA 53 has responded with processes and tools to include: establishment of a force-level warfare systems engineering process, stewardship of the Fleet's deployment-minus-thirty months (D-30) configuration management process per CINCLANTFLT/CINCPACFLT Inst. 4720.3A, and force-level interoperability assessment efforts using the Distributed Engineering Plant (DEP) land-based testing tool.

This project funds shore based testing and Combat System Integration Testing (CSIT) certification of integrated combat direction, weapon, sensor, and computing systems prior to their installation in operational fleet units. The operational computer systems are assembled and tested to assure proper configuration and interoperability in a test environment similar to their ultimate shipboard operational environment. Included is operational assessment testing of the integrated suite of computer programs. To support the Battle Group Interoperability (BGI) program, this project funds: Battle Group (BG)/Battle Force (BF) requirements engineering and analysis. BG/BF configuration management through the D-30 process and updates to the Surface Combat System Master Plan (SSCSMP) and Battle Group and Batttle Force interoperability testing (BGIT/BFIT) which is a prerequisite for operational Certification of the battle group configuration prior to deployment. BGIT/BFIT Certification of deploying Battle Group configurations in accomplished through the utilization of the Navy's Distributed Engineering Plant (DEP), which provides operational configurations for all combat system configurations located at multiple Navy land-based sites located across the country and connected via ATM networking technology. The DEP provides the only opportunity for comprehensive interoperability testing of combat system and C4I configuration items prior to shipboard delivery for operational use in surface combatant platforms and battle group units.

PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 00 ACCOMPLISHMENTS:

(U) (9.4) Conducted Combat System Integration Testing (CSIT) of Advanced Combat Direction System (ACDS) of Block-1, level 2.1x, ACDS Block-0, level 10,24, Cooperative Engagement Capability (CEC) Baseline-1, and Combat Direction System (CDS) level 12/13 in CV/CVN, LHD , LHA-1, LHA-2, DD and FFG ship classes. Continued design and development of surface ship test beds to include networks for the CVN-68, CVN-76 and LPD-17 ships/classes. Continued planning for out-year Combat System Integration Testing (CSIT) to include Common Scenario/Common Environment (CSCE) Simulation, test bed procedures design and development.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4**	R-1 ITEM NOMENCLATURE **Combat Systems Integration 0603582N**

(U) ($22.085) Conducted Battle Group Interoperability Testing (BGIT) in USS ABRAHAM LINCOLN, USS GEORGE WASHINGTON, USS ENTERPRISE, USS CONSTELLATION, USS HARRY S. TRUMAN, and USS ARL VINSON Carrier Battle Groups (CVBGs). Developed the test plans and test procedures to support Certifcation of surface ship class combat systems, C4ISR systems and Battle Group Interoperability (BGI). Prepared test beds at the Distributed Engineering Plant (DEP) to support Battle Group Interoperability Testing (BGIT) for up to six Carrier Battle Group (CVBGs).

(U) ($4.8) Continued execution of the Fleet's D-30 Process including: Battle Force Action Officer (BFAO) efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and engineering assessments. Continued SSCSMP updates.

(U) ($9.0) Continued Warfare Systems Engineering Requirements development. Conducted BG related systems engineering efforts to include Analysis of Alternatives (AOA). Continued to establish System Engineering Teams (SETs). Continued to develop Design Reference Mission (DRM) to communicate requirements in their operational context, and produced Warfare Area Layouts as integrated program plans for introducing new capability.

(U) ($1.989) COTS BMP - Funds assessment of potential application of COTS technology to resolve Fleet configuration management problems.

(U) ($29.195) Common Command and Decision**
- (U) ($2.081) Transition PMS 468 Program Office
- (U) ($1.287) Conducted Risk Mitigation Demonstrations
- (U) ($0.750) Initiated FAST TRACK SBIR for Middleware Portability
- (U) ($1.085) Procured Enterprise-wide System Engineering Collaborative tools for Lockheed Martin , Raytheon, Digital System Resources(DSR), and NSWC DD
- (U) ($1.025) Conducted root cause analysis of All Service Combatant ID Evaluation Test (ASCIET) data
- (U) ($12.500) Initiated Battle Group Domain Analysis Engineering
- (U) ($10.467) Developed Technical Specifications, Cost Estimates and Acquisition Documentation

**Funding for Common C&D will be under Program Element 0604518N for FY 02 and out.

2. (U) FY01 PLAN:

(U) ($9.731) Conduct Combat System Integration Testing (CSIT) of Advanced Combat Direction System (ACDS) Block-0, Level 10.25, Block-1 upgrades, Command and Control Processor (C2P) upgrades, Cooperative Engagement Capability (CEC) Baseline-2, Ship Self Defense System (SSDS) MK-2, Mod 0 in CV/CVN, LHD, and LHA ship classes. Continue design and development of surface ship test beds to include networks for the CVN-76 and CV/LHD SSDS MK-2, Mod 1 backfit classes. Continue planning for out-year Combat System Integration Testing (CSIT), including Common Scenario/Common Environment (CSCE) Simulation, test bed and test procedures design and development. Continue SSCSMP updates.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4**	R-1 ITEM NOMENCLATURE **Combat Systems Integration 0603582N**

(U) ($11.929) Provide Distributed Engineering Plant (DEP) Testbed to support land based testing of complex computer program configurations for the battleforce. Conduct Battle Group Interoperability Testing (BGIT) for JOHN F. KENNEDY, JOHN C. STENNIS, THEODORE ROOSEVELT Battle Groups. Conduct Collaborative Systems Test (CST) for JOHN F. KENNEDY Battle Group in support of CEC OPEVAL. Conduct Interoperability Systems Engineering Tests (ISETs) for root cause determination. of key interoperability trouble report observations.

(U) ($6.256) Continue execution of D-30 Process for all Battle Groups in the deployment cycle, including: BFAO efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and Engineering assessments. Continue configuration management for all battle groups. Support AMPS website and and Electronic Configuration Control Board (ECCB).

(U) ($4.082) Continue Warfare Systems Engineering Requirements development. Conduct BG related systems engineering efforts to include Analysis of Alternatives (AOA). Continue to establish System Engineering Teams (SETs). Continue to develop Design Reference Mission (DRM) to communicate requirements in their operational context, and produce Warfare Area Layouts as integrated program plans for introducing new capability.

(U) ($19.522) Common Command and Decision**
- (U) ($14.205) Continue Design Engineering.
- (U) ($2.389) Continue Acquisition Management Support.
- (U) ($2.928) Continue Technical Management Support.

**Continued funding for Common C&D will be provided under Program Element 0604518N for FY 02 and out.

(U) ($1.996) Development of optically multiplexed wideband radar beamfinder.

(U) ($0.945) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY02 PLAN:

(U) ($9.613) Conduct Combat System Integration Testing (CSIT) of Advanced Combat Direction System (ACDS) Block-0, level 10.24.X, ACDS Block-1 2.1.X, Combat Direction System (CDS) level 12.X/13.X in CV/CVN, LSD, and LHD ship classes, SSDS MK-2, Mod 2, and Command and Control Processor (C2P) upgrade. Continue planning for out-year Combat System Integration Testing (CSIT). Continue SSCMP updates.

(U) ($18.177) Provide Distributed Engineering Plant (DEP) Testbed to support land based testing of complex computer program configurations for the battleforce. Conduct Battle Group Interoperability Testing (BGIT) for LINCOLN/GEORGE WASHINGTON/KITTY HAWK, NIMITZ, TRUMAN Battle Groups. Conduct Interoperability Systems Engineering Tests (ISETs) for root cause determination of key interoperability trouble report observation.

(U) ($6.228) Continue execution of D-30 Process for all Battle Groups in the deployment cycle, including: BFAO efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and Engineering assessments. Continue configuration management for all battle groups. Support AMPS website and and Electronic Configuration Control Board (ECCB).

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4**	R-1 ITEM NOMENCLATURE **Combat Systems Integration 0603582N**

(U) ($3.954) Continue Warfare Systems Engineering Requirements development. Conduct BG related systems engineering efforts to include Analysis of Alternatives (AOA). Continue to establish System Engineering Teams (SETs). Continue to develop Design Reference Mission (DRM) to communicate requirements in their operational context, and produce Warfare Area Layouts as integrated program plans for introducing new capability.

(U) ($4.943) Fund Navy participation in Joint Distributed Engineering Plant (JDEP).

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 5**	R-1 ITEM NOMENCLATURE **Combat Systems Integration 0603582N**

B. Program Change Summary:

	FY2000	FY2001	FY2002
FY 2001 President's Budget:	78.305	32.966	38.054
Appropriated Value:	78.740	32.966	
Adjustment to FY 2000/2001 Appropriated Value/			
FY2001 President's Budget:	-1.94	21.495	4.861
FY 2002 PRES Budget Submit:	76.800	54.461	42.915

Funding:
FY2000: Decrease for Congressional Undistributed (-$1,807, and minor pricing adjustments of (-$.133)
FY 2001: Decrease for Congressional Undistributed (-$.505). Congressional increases for CC&D (+$20.000), and Optical Multiplex Wideband Radar Beamfinder (+$2.0).
FY2002: Decreases due to Common C&D transfer (-$13.700), Battle Force Interoperability Certification Program (+$14.100), Joint Distr Eng (+$5.000), and minor pricing adjustments (-$.539)

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary: Not applicable.

Related RDT&E: Computer programs developed under these programs are tested in their integrated configuration.

PE 0204571N (Consolidated Training Systems Development)
PE 0205620N (Surface ASW Combat System Technology)
PE 0603382N (Advanced Combat System Technology)
PE 0603755N (Ship Self Defense)
PE 0603852N (Cooperative Engagement Capability)
PE 0604307N (AEGIS Combat Systems Engineering)
PE 0604755N (Ship Self Defense)
PE 0604518N (CIC Conversion/Common Command and Decision)
PE 0603879N (Single Integrated Air Picture (SIAP))

Acquisition Strategy: Not applicable.

D. Schedule Profile: Not applicable.

Exhibit R-3 Cost Analysis								DATE: **JUNE 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **0603582N**			PROJECT NAME AND NUMBER **Combat Systems Integration**						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Combat Sys Integ Testing/SQI	WR/RC	NSWC PHD	7.500	8.200	VAR	6.000	VAR	4.646	VAR	Cont.	Cont	
Combat Sys Integ Testing/SQI	WR/RC	NSWC DD	0.000									
Combat Sys Integ Testing/SQI	WR/RC	VARIOUS	0.500	0.600		0.345		0.320		Cont.	Cont	
D-30 Process	WR/RC	NSWC PHD	3.500	4.100	VAR	4.400	VAR	4.792	VAR	Cont.	Cont	
D-30 Process	WR/RC	NSWC DD								N/A		
D-30 Process	WR/RC/PD	VARIOUS	0.100	0.150		0.160		0.108	VAR	Cont.	Cont	
DEP/BGIT Cert/Triage	WR/RC	NSWC PHD										
DEP/BGIT Cert/Triage	WR/RC	NSWC DD	13.202	16.601		9.225		17.149		Cont.	Cont	
DEP/BGIT Cert/Triage	WR/RC/PD	VARIOUS	1.220	2.332		0.713		3.644	VAR	Cont.	Cont	
Optical Multi-plex Wideband Radar	WR/RC	NSWC CRANE		1.989		1.996						
Warfare Sys Engineering	WR/RC	NSWC DD	1.700	2.000		1.000		1.022		Cont.	Cont	
Warfare Sys Engineering	WR/RC/PD	VARIOUS	2.900	2.228		1.950		1.841		Cont.	Cont	
Common C&D	WR/RC	NSWC DD	0.000	5.000		5.000		N/A				
Common C&D Contract Support	VARIOUS	VARIOUS	0.000	24.362		14.522		N/A				
Contract Engineering Support	VARIOUS	VARIOUS	5.936	6.806	VAR	6.045		7.243	VAR	Cont.	Cont	
Contract Program Mgt Support	VARIOUS	VARIOUS	0.854	1.162		2.000		2.050				
Travel		NAVSEA TRAVEL	0.080	0.205		0.160		0.100		Cont.	Cont	
SBIR Assessment	VARIOUS	VARIOUS		1.065		0.945						
Subtotal Product Development			37.492	76.800		54.461		42.915		Cont.	Cont	
Remarks:												
Total Cost			37.492	76.800		54.461		42.915		Cont.	Cont	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification									DATE: June 2001	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA4**					R-1 ITEM NOMENCLATURE Conventional Munitions/0603609N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002							
Total PE Cost	**37.665**	**33.310**	**22.299**							
Conventional Fuze/Warhead Package/K1821	**23.532**	**24.303**	**18.491**							
Optical Correlators/ K2393	**3.962**	**0.000**	**0.000**							
Non-Nuclear Expendable Ordnance/K2299/32299	**1.279**	**0.859**	**0.932**							
** Insensitive Munitions Advanced Development/S0363	**8.892**	**6.166**	**2.876**							
**Env Safe Ener Mat (S2611) included with S0363	**0.000**	**1.982**	**0.000**							
Quantity of RDT&E Articles										

A. Mission Description and Budget Item Justification

Conventional Fuze/Warhead Package (Project K1821/U1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This is the only Navy 6.3B RDT&E program that addresses improvements in warhead and fuze technology to meet this requirement.This program is a significant vehicle for orderly planning, timely and effective transition of Navy 6.2 and 6.3A investments into E&MD phase missile/weapon systems. This program addresses increased lethality against current and emerging threats, is resposive to all mission areas -- anti-air, strike, defense suppression, theater defense and sip defense, and supports development of complete ordnance sections.The current, on-going projects address significant technology advancements for missile systems by developing: mature physical concepts to enhance anti-air kill probability, advanced ordnance with augmented overland cruise missile defense and theater ballistic missile defense capabilities, and advanced seeker technology. The program supports the full spectrum of missile advanced development and technology improvements, and in future years will continue to provide the vehicle to address emergent requirements by transitioning mature development efforts into weapon systems with minimal technical and financial risk.

Non-Nuclear Expendable Ordnance (NNEO) (Project K2299): This item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance. It supports transition of the Multi-Function Fuze from Engineering and Manufacturing Development (E&MD) to production.

Insensitive Munitions Advanced Development (IMAD) (Project S0363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This IMAD program will provide, validate, and transition technology for explosives, propellants, and ordnance to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

Environmentally Safe Energetic Materials (Project S2611): This project will mature and demonstrate energetic materials and processes for explosives, propellants, and pyrotechnics which minimize or eliminate any adverse environmental impact normally associated with these materials in production and demilitarization. These new environmentally safe materials will meet insensitive munitions and system performance requirements while lowering the total ownership costs of the weapon systems.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA4**	R-1 ITEM NOMENCLATURE Conventional Munitions/0603609N

Optical Correlator Technology (Project K2393): The purpose of this effort is to enhance next generation target discrimination and aimpoint selection performance.

B. (U) Program Change Summary

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget Submit:	39.087	28.619	26.900
Appropriated Value:	39.309	33.619	
Adjustments to FY2000/2001 Appropriated Value			
FY2001 President's Budget:	-1.644	-0.309	-4.601
FY 2002 PRES Budget Submit:	37.665	33.310	22.299

Funding:
FY00 change is due to reduction for SBIR (-$0.590), midyear review reduction for Conventional Fuze/Warhead (-$0.563), across-the-board reduction (-$0.217), proportionate reduction (-$0.154) and minor pricing adjustments (-$0.120).
FY01 change is due to minor pricing adjustments (-$0.309)
FY02 change due to programmatic change for Insensitive Munitions (-$4.400), NWCF rate adjustments (-$0.264) and minor pricing adjustment (+$0.063).

Schedule: Not applicable.
Technical: Not applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Conventional Munitions/0603609N**				PROJECT NAME AND NUMBER Conventional Fuze and Warhead Package /K1821/U1821					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**23.532**	**24.303**	**18.491**							
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification

The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This is the only Navy 6.3B RDT&E program that addresses improvements in warhead and fuze technology to meet this requirement. This program is a significant vehicle for orderly planning, timely and effective transition of Navy 6.2 and 6.3A investments into E&MD phase missile/weapon systems. This program addresses increased lethality against current and emerging threats, is responsive to all mission areas -- anti-air, strike, defense suppression, theater defense and ship defense, and supports development of complete ordnance sections. The current, on-going projects address significant technology advancements for missile systems by developing: mature physical concepts to enhance anti-air kill probability, advanced ordnance with augmented overland cruise missile defense and theater ballistic missile defense capabilities, and advanced seeker technology. The program supports the full spectrum of missile advanced development and technology improvements, and in future years will continue to provide the vehicle to address emergent requirements by transitioning mature development efforts into weapon systems with minimal technical and financial risk.

(U) PROGAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
   - (U) ($1.101) ORDNANCE COMPONENT TECHNOLOGY: Initiated efforts on delayed functioning exploding foil initiator (EFI) and conduct tests of warhead fragmentation control candidates.
   - (U) ($1.269) ADVANCED AAW ORDNANCE: Conducted endgame analyses, test prototype warthead candidates.
   - (U) ($1.330) MEMS S&A: Hardware evaluations, design arming control unit, reliability analysis.
   - (U) ($.500) FUZE CONTACT DEVICE: Fabricated and evaluate baseline design.
   - (U) ($2.000) Mk 45 Mod 12/14 TDD: Began critical design and development of hardware and software.
   - (U) ($17.332) OFFICE OF SPECIAL PROJECTS

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N BA 4	**Conventional Munitions/0603609N**	Conventional Fuze and Warhead Packaging /K1821/U1821	

2. (U) FY 2001 PLAN:
- (U) ($2.000) WARHEAD DOWNSELECT: Continue warhead effectiveness analysis, end game analysis, and multi-point initiator improvements.
- (U) ($2.100) MEMS S&A: Conduct critical tests.
- (U) ($9.538) Mk 45 Mod 12/14 TDD: Continue MK 45 MOD 12/14 TDD development.
- (U) ($1.503) FSMS STUDIES: Continue system engineering studies integrating warhead and fuze developments into advanced missile systems.
- (U) ($8.710) OFFICE OF SPECIAL PROJECTS
- (U) ($0.452) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
- (U) ($2.000) WARHEAD DOWNSELECT: Continue warhead effectiveness analysis, end game analysis, and multi-point initiator improvements.
- (U) ($3.500) MEMS S&A: Conduct critical tests.
- (U) ($7.791) TARGET DETECTING DEVICE: Continue MK 45 MOD 12/14 TDD development.
- (U) ($1.200) FSMS STUDIES: Continue system engineering studies integrating warhead and fuze developments into advanced missile systems.
- (U) ($4.000) OFFICE OF SPECIAL PROJECTS

B. Other Program Funding Summary: Not applicable.
C. Acquisition Strategy: Not applicable.
D. Program Schedule: Not Applicable.

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Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA 4**			PROGRAM ELEMENT **Conventional Munitions/0603609N**			PROJECT NAME AND NUMBER Conventional Fuze and Warhead Package/K1821/U1821						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Design and Analysis	WR	NSWC/DD	29.948	0.528	11/99	0.570	11/00	0.800	11/01	Continuing	Continuing	
	WR	NAWC/China Lake	57.564	1.152	11/99	1.230	11/00	0.470	11/01	Continuing	Continuing	
	CPAF	Raytheon	6.074	0.000		0.000		0.000		0.000	6.074	6.074
	PR	JHU/APL	0.000	0.000		1.503	11/00	1.200	11/01	Continuing	Continuing	
	RC	ONR	0.052	0.000		0.000		0.000		Continuing	Continuing	
	PD	Office of Special Projects	7.751	0.000		0.000		0.000		0.000	7.751	N/A
Hardware Fabrication & Procurement	WR	NSWC/DD	5.700	0.312	11/99	0.415	11/00	0.780	11/01	Continuing	Continuing	
	WR	NAWC/China Lake	7.300	0.988	11/99	0.625	11/00	1.545	11/01	Continuing	Continuing	
	CPAF	Raytheon	0.500	0.000		6.990	11/00	5.591	11/01	0.000	13.081	13.081
Other	PD	Office of Special Projects	15.182	17.332	12/99	8.710	12/00	3.925	12/01	Continuing	Continuing	
Subtotal Product Development			130.071	20.312		20.043		14.311		Continuing	Continuing	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N BA 4**

PROGRAM ELEMENT: **Conventional Munitions/0603609N**

PROJECT NAME AND NUMBER: Conventional Fuze and Warhead Package/K1821/U1821

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Demonstration Test & Evaluation	WR	NSWC/DD	11.447	1.000	11/99	0.940	11/00	1.840	11/01	Continuing	Continuing	
	WR	NAWC/China Lake	11.482	2.000	11/99	3.100	11/00	2.120	11/01	Continuing	Continuing	
Subtotal T&E			22.929	3.000		4.040		3.960		Continuing	Continuing	
Remarks:												
Program Management Support	WR	NSWC/DD	1.949	0.075	11/99	0.075	11/00	0.075	11/01	Continuing	Continuing	
	WR	NAWC/China Lake	3.235	0.075	11/99	0.075	11/00	0.075	11/01	Continuing	Continuing	
	C/FPI	TMAI	0.010	0.020	11/99	0.020	11/00	0.020	11/01	Continuing	Continuing	
Travel	PD	NAVSEA Travel	0.250	0.050	Various	0.050	Various	0.050	Various	Continuing	Continuing	
Subtotal Management			5.444	0.220		0.220		0.220		Continuing	Continuing	
Remarks:												
Total Cost			158.444	23.532		24.303		18.491		Continuing	Continuing	

Remarks:

EXHIBIT R-2a, RDT&E Project Justification										DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Conventional Munitions/0603609N**				PROJECT NAME AND NUMBER Non-Nuclear Expendable Ordnance (NNEO)/32299					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**1.279**	**0.859**	**0.932**							
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification:

This budget item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance (NNEO) outside existing operational requirements. The commodities comprising 2T NNEO are: Major and medium caliber gun ammunition, small arms ammunition, other ship gun ammunition, pyrotechnics, and demolition items. There are no other RDT&E budget items supporting the 2T NNEO program. This project supports the Multi-function Fuze (MFF), Mk 2 Grenade Proximity Fuze, Cargo Competent Fuzes and Extended Range Propelling Charges. These fuzes will be used with 5"/54 gun ammunition.

(U) PROGAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 00 PLANS:
 - (U) ($.679) Multi-Function Fuze (MFF): Begin work on antenna improvements which will reduce MFF costs.
 - (U) ($.600) Multi-Function Fuze (MFF): Extended Range Propelling Charge Qualification

2. (U) FY 01 PLANS:
 - (U) ($.200) Multi-Function Fuze (MFF): OPEVAL Expense
 -(U) ($.655) Multi-Function Fuze (MFF): Complete antenna improvements started in FY 00.
 - (U) ($.004) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 02 PLANS:
 - (U) ($.932) Multi-Function Fuze (MFF): P3I items include: evaluation of Micro-Electro-Mechanical System (MEMS) Technology and begin Preliminary Design integration.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA 4	**Conventional Munitions/0603609N**	Non-Nuclear Expendable Ordnance (NNEO)/32299

B. Other Program Funding Summary

1. (U) Related RDT&E: PE 0603795 (Naval Surface Fire Support)
2. (U) The 5"/54 Improved Conventional Munition projectile will be qualified with the MFF. Approval decision for proceeding with Low Rate Initial Production in 3rd quarter FY99. Milestone III scheduled for 1st quarter FY02

Procurement of Ammunition, Navy and Marine Corps (PANMC) 5"/54 Ammunition, BLIN 025000, Cost Code AC893 (Reno)

FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
1.9	3.8	3.7						TBD	TBD

C. Acquisition Strategy: Award 5-Year (Multi-Year) Contract for MFF. As P3I are completed, they will be incorporated into the next production lot.

D. Schedule Profile

	FY 2000	FY 2001	FY 2002
Program Milestones			1Q MSIII 2Q IOC
Engineering Milestones	3Q Production Baseline Finalized		
T&E Milestones		3Q OPEVAL	2Q P3I Tech Eval
			2Q Follow on Production
Contract Milestones	3Q P31		

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA 4	**Conventional Munitions/0603609N**	Non-Nuclear Expendable Ordnance (NNEO)/32299

C. Other Program Funding Summary

1. (U) The 5"/62 Extended Range Cargo Propelling Charge will be used with all HI-Frag Shaped Projectiles

Procurement of Ammunition, Navy and Marine Corps (PANMC) Reimbursable, Cost Code R6700

FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
0	2.2	0	0	0	0	0	0	TBD	TBD

C. Acquisition Strategy: Procure LRIP in 3Q FY 01

D. Schedule Profile

	FY 2000	FY 2001	FY 2002
Program Milestones	4Q Qual Prog		
Engineering Milestones			
T&E Milestones		2Q OA	
Contract Milestones		3Q LRIP	

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N BA 4** | PROGRAM ELEMENT: **Conventional Munitions/0603609N** | PROJECT NAME AND NUMBER: Non-Nuclear Expendable Ord (NNEO)/32299

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Dahlgren	0.718	0.084	VAR	0.459	VAR	0.250	VAR	CONT.	CONT	N/A
	C/CPFF	ALLIANT	0.536	0.094	VAR	0.200	VAR	0.682	VAR	CONT.	CONT	N/A
	SS/CPFF	MOTOROLA	0.200	0.136	VAR	0.000		0		CONT.	CONT	N/A
	WR	NSWC Indian Head		0.600								
Subtotal Product Development			1.454	0.914		0.659		0.932				N/A

Remarks:

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA 4**		PROGRAM ELEMENT **Conventional Munitions/0603609N**				PROJECT NAME AND NUMBER Non-Nuclear Expendable Ord (NNEO)/32299						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC DAHLGREN	0.298	0.225	VAR	0.000		0.000		CONT	CONT.	N/A
	WR	NAWC CHINA LAKE	0.200	0.000	VAR	0.000		0.000		CONT	CONT.	N/A
Operational Test &Evaluation	WR	COMOPTEVFOR	0.000	0.000		0.200		0.000				N/A
Subtotal T&E			0.498	0.225		0.200		0.000				
Remarks:												
Contractor Engineering Support		EDO		0.032								
Government Engineering Support	WR	NSWC DAHLGREN	0.198	0.075	11/99	0.000		0.000		CONT	CONT.	N/A
Program Management Support	WR	NSWC DAHLGREN	0.080	0.013	11/99	0.000		0.000		CONT	CONT.	N/A
Travel	WR	NSWC DAHLGREN	0.010	0.010								
Labor (Research Personnel)												
Overhead	WR	NSWC DAHLGREN	0.010	0.010								
Subtotal Management			0.298	0.140		0.000		0.000		CONT	CONT.	N/A
Remarks:												
Total Cost			2.250	1.279		0.859		0.932		CONT.	CONT.	N/A
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA4**	PROGRAM ELEMENT NAME AND NUMBER **Conventional Munitions/0603609N**				PROJECT NAME AND NUMBER INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**8.892**	**6.166**	**2.876**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:
Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. This program will provide, validate and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. The Insensitive Munitions (IM) Advanced Development Program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuzes and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement and considered as part of a weapon design per DoD 5000.2R.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($1.797) Validated and assessed weapon systems POA&Ms for IM compliance. Compiled and analyzed weapon system, energetic material and generic technology IM test data.
- (U) ($2.280) Demonstrated high explosives that show improved IM characteristics while maintaining or improving operational performance. Demonstrated high performance cast explosive. Continued qualification and evaluation of internal blast explosive and pressed metal accelerating explosives. Continued evaluation of improved performance deformable explosive. Began qualification of high performance, low cost replacement for projectile explosives.
- (U) ($0.715) Evaluated IM ordnance concepts. Conducted system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continued modeling applications that reduce and enhance IM warhead design and test efforts. Completed evaluation of improved warhead concepts for shoulder launched weapons. Continued demonstration and evaluation of improved air-to-air warheads, and

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EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA4	**Conventional Munitions/0603609N**	INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363

1. (U) FY 2000 ACCOMPLISHMENTS: (Continued)
penetrator warheads. Continued demonstration and evaluation of improved submunition case concepts.
- (U) ($3.100) Evaluated and demonstrated IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Demonstrated an insensitive, multi-mission, high performance rocket motor. Demonstrated high-pressure propellants in high-pressure composite motor cases. Continued demonstration of dual-pulse boost rocket motor for surface systems.
- (U) ($1.000) Continued the evaluation and demonstration of solventless processing of explosive molding powder. Demonstrated the recycle, recovery and reuse of hydrolyzable rocket propellent formulations. Evaluated and predicted the environmental impact and associated life cycle costs for energetic materials and processes. This was included in the FY 00 Project S0363 control but executed out of the FY 00 Project S2611

2. (U) FY 2001 PLAN:
- (U) ($1.618) Continue validation and assessment of weapon systems POA&Ms for IM compliance. Continue compilation and analysis of weapon system, energetic material and generic technology IM test data.
- (U) ($2.379) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance. Continue qualification of internal blast explosive. Continue evaluation of pressed metal accelerating explosives, including new high performance applications. Evaluate improved underwater explosives. Complete evaluation and qualification of booster explosives formulations
- (U) ($0.315) Evaluate ordnance and container concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling applications that reduce and enhance IM warhead design.
- (U) ($1.830) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Continue evaluation of high-pressure propellants in high-pressure composite motor cases.
- (U) ($0.024) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA4	**Conventional Munitions/0603609N**	INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363

3. (U) FY 2002 PLAN: (Continued)
- (U) ($1.104) Continue validation and assessment of weapon systems POA&Ms for IM compliance. Continue compilation and analysis of weapon system, energetic material and generic technology IM test data.
- (U) ($0.660) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance. Continue qualification of internal blast explosive. Continue evaluation of pressed metal accelerating explosives. Begin qualification high performance booster explosive to weapons systems.
- (U) ($0.050) Evaluate ordnance and container concepts. Continue modeling applications that reduce and enhance IM warhead design.
- (U) ($1.062) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Continue demonstration of an insensitive, multi-mission, high performance rocket motor.

B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE

(U) RELATED RDT&E:
(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0602315N (MCM, Mining and Special Warfare Technology)
(U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
(U) PE 0604603N (Unguided Conventional Air-launched Weapons)
(U) Cooperative technology transfer efforts with all weapons project offices are in progress.

C. (U) ACQUISITION STRATEGY: NOT APPLICABLE

D. (U) SCHEDULE PROFILE: NOT APPLICABLE

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Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N BA4	**Conventional Munitions/0603609N**	INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Propulsion Dev. and Eval.	WR	NAWC WPN DIV/China Lake	79.254	2.350	11/99	1.830	11/00	1.062	11/01	Continuing	Continuing	NA
	RCP	NAWC WPN DIV/China Lake	9.500	0.750	11/99	0.000	NA	0.000	11/01	Continuing	Continuing	NA
Explosives Dev. and Eval.	WR	NSWC/Indian Head Div	62.744	3.200	11/99	2.369	11/00	0.650	11/01	Continuing	Continuing	NA
Ordnance Dev. and Eval.	WR	NSWC/Dahlgren Div	18.375	0.725	11/99	0.315	11/00	0.050	11/01	Continuing	Continuing	NA
Pyrotechnics Dev. and Eval.	WR	NSWC/Crane Div	6.520	0.020	11/99	0.010	11/00	0.010	11/01	Continuing	Continuing	NA
Subtotal Product Development			176.393	7.045		4.524		1.772		Continuing	Continuing	NA

Remarks: This cost category includes technology development and subsequent test and evaluation of Insensitive Munitions concepts for propulsion, explosives, ordnance and pyrotechnics. Environmentally Safe Energetics Development was a Congressional add for FY 99 (in S2611) and FY 00 (in S0363). The efforts transitioned to S0363 in FY 00.

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Support categories not applicable to this Non-ACAT program.

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N** | PROGRAM ELEMENT: **Conventional Munitions/0603609N** | PROJECT NAME AND NUMBER: INSENSITIVE MUNTIONS ADVANCED DEVELOPMENT / SO363

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: This project, S0363, Insensitive Munitions Advanced Development (IMAD), is a Non-ACAT program. As such no formal, separate developmental or operational test and evaluation plans or efforts are included. Formal DT and OT is conducted once the concepts developed by IMAD are transitioned to weapon development and product improvement programs.

Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support		NSWC IH DIV	25.743	1.762	11/99	1.622	11/99	1.084	11/00	Continuing	Continuing	NA
Travel		NAVSEASYSCOM	0.206	0.085	10/99	0.020	10/99	0.020	10/00	Continuing	Continuing	NA
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			25.949	1.847		1.642		1.104		Continuing	Continuing	NA

Remarks:

Total Cost			202.342	8.892		6.166		2.876		Continuing	Continuing	NA

Remarks: Performing activities include:
NSWC/DAHLGREN, NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE

EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA4**	PROGRAM ELEMENT NAME AND NUMBER **Conventional Munitions/0603609N**				PROJECT NAME AND NUMBER ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**0.000**	**1.982**	**0.000**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:
The development, manufacture and demilitarization of energetic materials generate significant quantities of waste. The generation and subsequent disposal of this waste has come under increased scrutiny and regulation by Federal, State and local officials. Additionally, due to environmental compliance and waste disposal issues, the cost of energetic materials is rapidly increasing. New technologies, energetic materials and ingredients that minimize any adverse environmental impact are being developed within the Navy's science and technology initiatives. These technologies are commonly referred to as "green" energetic materials. The efforts under this project will provide, validate, and transition technology for explosives, propellants and pyrotechnics using materials and compositions that have low adverse environmental impact in production and demilitarization, will meet insensitive munitions requirements and will have no reduction to combat performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS: NOT APPLICABLE

2. (U) FY 2001 PLAN:
- (U) ($1.982) Continue the evaluation and demonstration of solventless processing of explosive molding powder. Demonstate the recycle, recovery and reuse of hydrolyzable rocket propellant formulations. Identify and evaluate low cost thermoplastic elastomer binders. Evaluate properties of reclaimed energetic ingredients for use in Navy explosives and propellants. Evaluate and predict the environmental impact and associated life cycle costs for energetic materials and processes.

3. (U) FY 2002 PLAN: NOT APPLICABLE

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EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA4	**Conventional Munitions/0603609N**	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611	

B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0602315N (MCM, Mining and Special Warfare Technology)
(U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
(U) PE 0604603N (Unguided Conventional Air-launched Weapons)

C. (U) ACQUISITION STRATEGY: NOT APPLICABLE

D. (U) SCHEDULE PROFILE: NOT APPLICABLE

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Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N / BA4	**Conventional Munitions/0603609N**	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Technology Development	WR	NSWC IH DIV 0	0.903	0.000	02/00	1.977	10/00	0.000	NA	0.000	2.880	NA
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			0.903	0.000		1.977		0.000		0.000	2.880	

Remarks:

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Categories do not apply.

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N / BA4	**Conventional Munitions/0603609N**	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation			0.000			0.000						
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: This project, S2611, Environmentally, is a Non-ACAT program and a FY 99 Congressional plus-up. As such no formal, separate developmental or operational test and evaluation plans or efforts are included. Formal DT and OT is conducted once the concepts developed are transitioned to weapon development and product improvement programs.

Contractor Engineering Support												
Government Engineering Support												
Program Management Support	WR	NSWC IH DIV	0.065	0.000	02/00	0.000	10/00	0.000	NA	0.000	0.065	
Travel						0.005	10/00				0.005	
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.065	0.000		0.005		0.000		0.000	0.070	

Remarks:

Total Cost			0.968	0.000		1.982		0.000		0.000	2.950	

Remarks:

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603611M Marine Corps Assault Vehicles**					PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Vehicle (AAAV)**					
COST ($ in Millions)	Prior Yrs Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
B0020 ADVANCED AMPHIBIOUS ASSAULT VEHICLE	**279.200**	**110.937**	**147.100**	**263.066**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont.**
Quantity of RDT&E Articles		**1**									

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The Advanced Amphibious Assault Vehicle (AAAV) Program will field a successor to the Marine Corps' current amphibious vehicle, the Assault Amphibious Vehicle Model 7A1 (AAV7A1). The AAAV will provide the principal means of tactical surface mobility for the Marine Air Group Task Force (MAGTF) during both ship-to-objective maneuvers and subsequent combat operations ashore as part of the Navy and Marine Corps concept of Operational Maneuver from the Sea (OMFTS). The AAAV will provide the Marine Corps with the capability to execute the full spectrum of military missions from humanitarian operations to conventional combat operations. The AAAV replaces the AAV7A1 Vehicle, which was originally fielded in the early 1970's. The AAAV is a self-deploying, high-water speed, amphibious, armored, tracked vehicle capable of operating in all weather as well as Nuclear, Biological, and Chemical (NBC) environments.

The AAAV program is the only ACAT-1D program managed by the Marine Corps. The AAAV is the next generation of Marine Corps Assault Vehicles being developed to satisfy the requirements of the 21st Century Marine Warfighters. Along with the Landing Craft Air Cushion (LCAC) and the MV-22 Osprey, the AAAV will provide the Marine Corps with the tactical mobility assets required to spearhead the OMF concept. Acquisition of the AAAV is critical to the Marine Corps. The total AAAV requirement is for 1,013 weapon systems. The AAAV program remains the Marine Corps number one priority ground system acquisition.

The program received approval to enter the Systems Development and Demonstration (SDD) Phase (formerly Engineering and Manufacturing Development) of acquisition process during the Milestone II Defense Acquisition Board Readiness Meeting held on 26 November 2000. All program exit criteria were successfully met or exceeded. The SDD Phase (2001 through 2006) will include validation of manufacturing and production processes, fabrication and testing of SDD vehicles, and finalizing and implementing the Life Cycle Management for AAAV.

PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 Accomplishments:

- (U) $ 90.054 Continued PDRR phase. Completed assembly of second and third prototypes. Continued extensive contractor testing of all three prototypes. Continued AAAV(C) system development. Continued AAAV Survivability program. Demonstrated the final Milestone II exit criteria.
- (U) $ 9.833 Continued to provide in-house technical support.
- (U) $ 5.332 Continued to provide program support to coordinate and update program planning, program analysis, and program execution. Prepared for the FY01 Defense Acquisition Board review.
- (U) $ 5.718 Initiated combined government/contractor Developmental Testing-I (DT-I). Initiated Ballistic Hull and Turret test planning.

(U) Total $ 110.937

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603611M Marine Corps Assault Vehicles**	PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Vehicle (AAAV)**

FY 2001 Planned Program:

- (U) $ 24.497 Complete PDRR phase. Continue AAAV (C) system development and AAAV survivability program.
- (U) $ 99.133 Transit Milestone II DAB and award the System Development and Demonstration contract. Initiate material procurement for SDD phase prototypes. Continue design development of the AAAV. Continue Developmental testing of PDRR prototype
- (U) $ 10.366 Continue to provide in-house technical support.
- (U) $ 5.411 Continue to provide program support to coordinate and update program planning, program analysis, and program execution.
- (U) $ 3.856 Conduct and complete Early Operational Assessment (EOA) testing on PDRR prototype. Conduct EOA assessment on AAAV © mock-ups. Complete Ballistic Hull and Turret testing.

(U) $ 3.837 Portion extramural program reserved of Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) Total $ 147.100

FY 2002 Planned Program:

- (U) $ 240.196 Initiate fabrication of the SDD phase prototypes. Continue design development of the AAAV (P) and AAAV (C). Continue developmental testing of PDRR prototypes. Continue AAAV survivability program. Initiate contractor/government shakedown testing of SDD prototypes
- (U) $ 10.029 Continue to provide in-house technical support.
- (U) $ 7.691 Continue to provide program support to coordinate and update program planning, program analysis, and program execution.
- (U) $ 0.800 Initiate development of AAAV training courseware.
- (U) $ 4.350 Initiate Ballistic Vulnerability testing of one PDRR prototype. Conduct RAM-D testing of PDRR prototypes.

(U) Total $ 263.066

B. (U) PROJECT CHANGE SUMMARY

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	114.210	137.981	178.680
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-2.822		
(U) Execution Adjustment			
(U) Minor Affordability Adjustment			
(U) Program Adjustment	-0.451	9.119	84.386
(U) FY 2002 President's Budget:	110.937	147.100	263.066

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 2000 reflects a decrease of $2.822M for SBIR and $.451M for program adjustments. FY 2001 reflects a Congressional increase of $12.5M, pro-rata reductions of $1.053M and $.328M, and a below-threshold reduction of $2M. FY 2002 reflects internal Marine Corps reprogramming of $84.386M.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603611M Marine Corps Assault Vehicles**	PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Vehicle (AAAV)**	

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) PANMC, BLI #147500, AAAV									Continuing	Continuing
(U) PMC, BLI #202200, AAAV			1.512						Continuing	Continuing

(U) Related RDT&E: Not Applicable.
(U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C0021, AAV7A1.
(U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C2237, AVTB.

(U) C. ACQUISITION STRATEGY: * An explanation of acquistion, management, and contracting strategies shall be provided for each project.

The AAAV Program acquisition strategy includes the extensive use of test assets, models, simulation, and advanced technology research to optimize vehicle design, reduce Total Ownership Cost (TOC), vehicle unit cost, and add flexibility to the program schedule. Three mature PDRR prototypes were developed and are currently undergoing developmental testing to further vehicle maturity. During the SDD phase of the program, nine vehicles will be manufactured. A tenth vehicle will be manufactured for use during Full Up System Level Live Fire testing planned to being in FY04. LRIP vehicles will be developed following the LRIP decision review in FY04 for use during Initial Operational Test and Evaluation (IOT&E). Initial Operational Capability (IOC) and Full Operational Capability (FOC) will occur in FY06 and FY16, respectively.

The AAAV management strategy is event driven, designed to ensure a logical progression through the AAAV acquisition to reduce risk, ensure affordability, and provide adequate information to decision makers regarding acquisition progress. The AAAV Program team is a partnership of government and industry experts, committed to developing the most versatile combat vehicle, providing the optimum balance of combat effectiveness, affordability, innovation, and technology. The program Integrated Product Teams (IPTs), composed of contractors, sub-contractors, Marines, and government civilians, are the foundation of the AAAV acquisition management process. The government, prime contractor, and major subcontractors are co-located in a highly integrated communication environment that facilitates proactive decision-making processes and flexible execution of plans to support these teams and product development. CAIV has been institutionalized throughout the program and as such is an integral consideration in all trade studies and decisions. The program has had a highly integrated and extensive test approach since its inception which has included a very strong engineering-model and prototype testing program supported by extensive modeling and simul

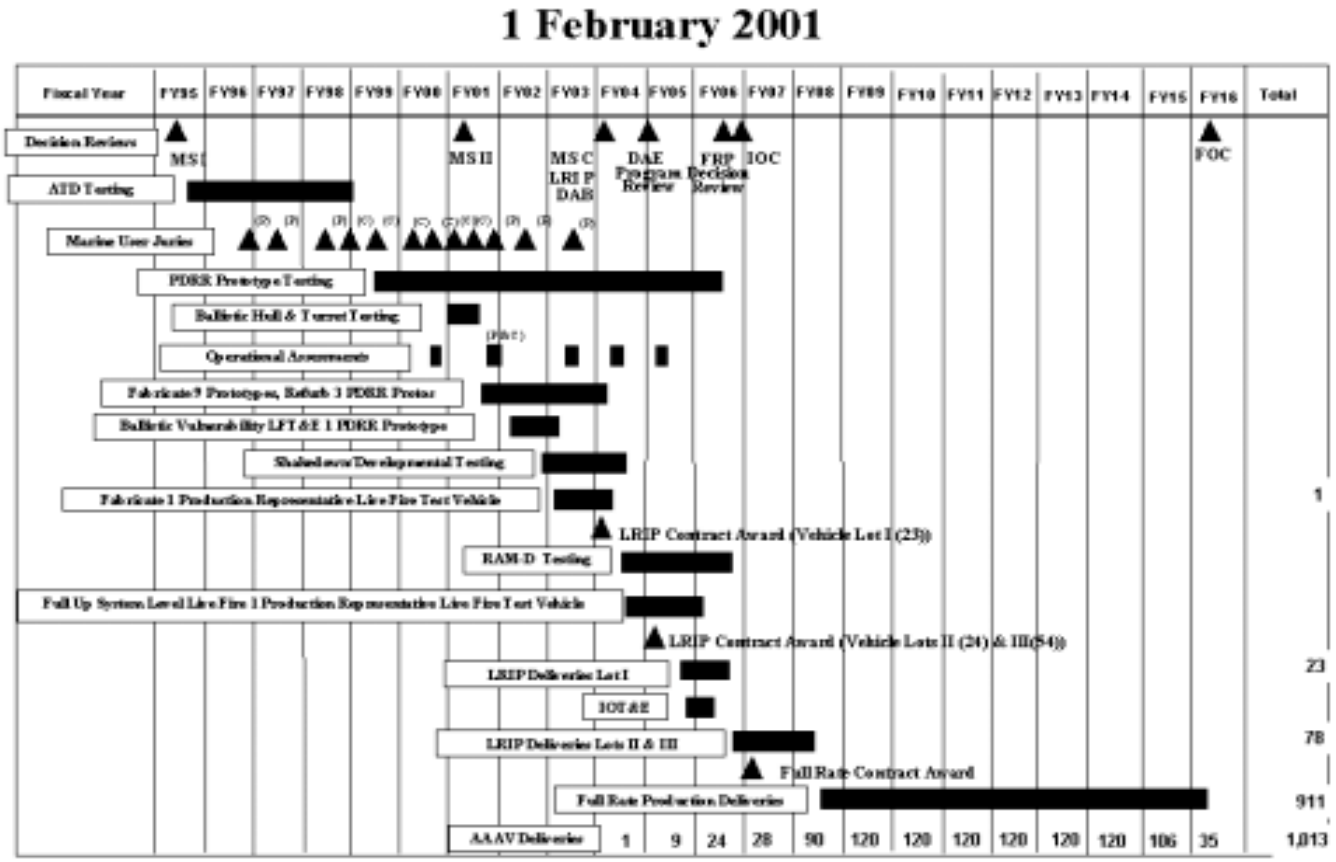
strategy includes planning for life cycle support once the system is fielded to more efficiently manage and optimize operating and support requirements and reduce overall program cost.

The program's contracting approach for the AAAV is to award the vast majority of the work to one prime contractor, competitively selected in 1996. GDLS operating through its division GDAMS will be responsible for designing and producing the vehicle and providing support for testing from PDRR through LRIP. The contracting strategy for full rate production and subsequent operation and support is to encourage competition during the SDD phase. Contracts for Government Furnished Property will be kept to a minimum and will include only property which could not otherwise be available to the contractor. Local Area Network support contract is currently provided by an 8(a) firm. Contract support for programmatic and technical support is currently provided by a competitively awarded firm-fixed price, level of effort contract and will be recompeted during FY03. The Life Cycle Support Contract is scheduled for award during FY05 for a portion of the initial operations and maintenance support for the fielded AAAVs.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603611M Marine Corps Assault Vehicles**	PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Vehicle (AAAV)**

(U) D. SCHEDULE PROFILE:



CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**		PROGRAM ELEMENT **0603611M Marine Corps Assault Vehicles**					PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Veh.(AAAV)**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PDRR Contract	CPAF	GDLS - PDRR Award	216.715	90.058	1/	24.497	1/			Continuing	Continuing	$332M
SDD Contract	CPAF	GDLS - SDD Award	0.000	0.000		99.133	2/	240.196	2/	Continuing	Continuing	2/
										Continuing	Continuing	
Subtotal Program Dev Spt			216.715	90.058		123.630		240.196		Continuing	Continuing	

Remarks:

1/ The PDRR contract was awarded June 1996. The contract award is for the entire PDRR effort and is incrementally funded.

2/ The projected contract award date for the SDD effort is June 2001. The SDD contract is for the entire SDD effort and is incrementally funded.

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Program Support		EG&G, Manassas, VA	3.793	4.247	3/	4.366	3/	4.497	3/	Continuing	Continuing	$23M
Program Support		Misc. Government Contracts	7.677	1.085	4/	1.045	4/	3.194	4/	Continuing	Continuing	
Training		Misc. Government Contracts	0.000	0.000		0.000		0.800	4/	0.000	0.800	
Subtotal Program Support			11.470	5.332		5.411		8.491		0.000	0.800	

3/ EG&G contract (FFP with options) was awarded August 1998 for contract performance thru 2003.
4/ Various contract award dates.

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Testing		Miscellaneous	2.029	5.718	4/	3.856	4/	4.350	4/	Continuing	Continuing	
											0.000	
											0.000	
											0.000	
Subtotal T&E			2.029	5.718		3.856		4.350		Continuing	Continuing	

Remarks:

4/ Various contract award dates.

CLASSIFICATION:

Exhibit R-3 Cost Analysis											DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**			PROGRAM ELEMENT **0603611M Marine Corps Assault Vehicles**					PROJECT NUMBER AND NAME **B0020 Advanced Amphibious Assault Veh.(AAAV)**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
In-house technical support		Various Government Labs	17.962	9.833		10.366		10.029			48.190	
SBIR IAW USC 638						3.837					3.837	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			17.962	9.833		14.203		10.029		0.000	52.027	
Remarks:												
Total Cost				110.941		147.100		263.066		Continuing	Continuing	

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**				PROGRAM ELEMENT (PE) NAME AND NO. **0603635M Marine Corps Ground Combat/Supporting Arms Systems**						
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Total PE Cost	**47.331**	**32.416**	**25.957**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
C1964 Anti-Armor Weapon System	**0.413**	**0.608**	**0.630**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
C2112 Lightweight 155mm Howitzer (LW155)	**26.345**	**12.998**	**18.203**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**57.546**
C2113 Short Range Air-Tank Weapon (SRAW/Predator)	**10.765**	**0.488**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**11.253**
C2256 Integrated Infantry Combat System	**0.594**	**2.581**	**1.743**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
C2507 Family of Small Craft	**1.395**	**1.741**	**2.930**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**6.066**
C2508 Internally Transportable Vehicle (ITV)	**4.897**	**6.570**	**2.451**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**13.918**
C2614 SMAW Follow-On	**2.922**	**2.972**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**5.894**
C2615 M1A1 Antipersonnel Ammunition	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
C2998 Innovative Stand-Off Door Breacher	**0.000**	**4.458**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**4.458**
Quantity of RDT&E Articles (C2508 ITV)		**8**								

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations.

This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ground weapon system.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT (PE) NAME AND NO. **0603635M Marine Corps Ground Combat/Supporting Arms Systems**

B. PROGRAM CHANGE SUMMARY

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	50.375	22.973	8.432
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-0.744	0.000	0.000
(U) Execution Adjustment	-0.225	0.000	0.000
(U) Minor Affordability Adjustment	-0.231	-0.300	-0.451
(U) Program Adjustment	-1.844	9.743	17.976
(U) FY 2002 President's Budget:	47.331	32.416	25.957

CHANGE SUMMARY EXPLANATION:

(U) Funding: See Above. (See R-2a for breakout at project level).

(U) Schedule: Delays for C2112 LW155 project and C2508 ITV Project (see R-2a).

(U) Technical: See C2508 ITV Project R-2a.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**					PROJECT NUMBER AND NAME **C1964 Anti-Armor Weapon System**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**0.413**	**0.608**	**0.630**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) This project provides for Marine Corps participation in the Joint Anti-Armor Program entitled Javelin (Advanced Anti-Tank Weapon System - Medium (AAWS-M)) and the Anti-Armor Weapon System - Heavy (AAWS-H). The Javelin weapon system Pre-Planned Product Improvement program (P3I) will provide the Marine Corps and Army with state-of-the-a capability to destroy sophisticated and future armored threats. The AAWS-H is a long range, antitank weapon system that will replace the Tube Launched, Optically Tracked, Wire Guided Missile System. It will satisfy an operational requirement to provide increased range (4000 meters), increased lethality against all armored threats, to include explosive reactive armor, active protection, increased probability of hit and kill and increased gunner survivability. Possible Light Armored Vehicle-Anti Tank usage would promote commonality among Marine Corps systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) $ 0.218 Provided Engineering/Technical support to participate in Product Qualification Testing and Pre-planned Product Improvement for the Javelin program.
- (U) $ 0.195 Provided Engineering and Technical Support to participate in technical developments in the AAWS-H program.

(U)Total $ 0.413

2. FY 2001 PLANS:

- (U) $ 0.242 Engineering/Technical support to monitor and participate in Product Qualification Testing and Pre-planned Product Improvement for the Javelin program.
- (U) $ 0.212 Engineering/Technical support to monitor and participate in technical developments in the AAWS-H program.
- (U) $ 0.121 Conduct Analysis of Alternatives for AAWS-H program.
- (U) $ 0.031 Program Office documentation support for the AAWS-H program.
- (U) $ 0.002 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U)Total $ 0.608

3. FY 2002 PLANS:

- (U) $ 0.242 Engineering/Technical support to participate in Product Qualification Testing and Pre-planned Product Improvement for the Javelin program.
- (U) $ 0.338 Engineering/Technical support to participate in technical developments in the AAWS-H program
- (U) $ 0.050 Program Office documentation support for the AAWS-H program.

(U)Total $ 0.630

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROJECT NUMBER AND NAME **C1964 Anti-Armor Weapon System**

Project Change Summary	FY 2000	FY 2001	FY 2002
(U) Previous President's Budget	0.629	0.613	0.635
(U) Adjustments to Previous President's Budget			
SBIR/STTR Transfer			
Execution Adjustment			
Minor Affordability Adjustment	-0.002	-0.005	-0.010
Program Adjustment	-0.214		0.005
(U) Current Budget Submit	0.413	0.608	0.630

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
(U) PMC BLI# 301100	92.512	28.852	1.036	0.000	0.000	0.000	0.000	0.000	0.000	Cont.

(U) Related RDT&E: Not Applicable.

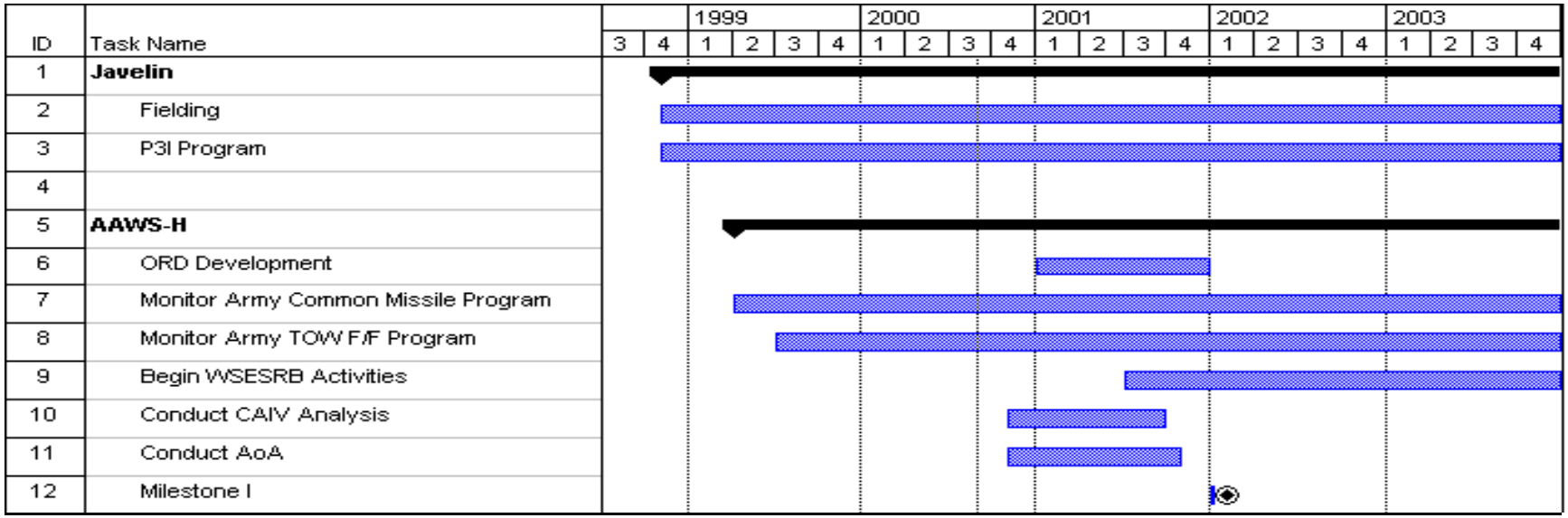
(U) C. ACQUISITION STRATEGY:

AAWS-H - The acquisition strategy anticipates a Competetively Awarded Cost Plus Development Contract with follow-on Firm Fixed Price Production Contract. JAVELIN - Acquisition strategy provides for pre-planned improvements for the Javelin hardware which is procured under a Firm Fixed Price Multi-Year Contract. The first Multi-Year covers FY 97 through FY 99. Hardware on this contract includes the Command Launch Unit (CLU), Tactical Rround, Battery Unit, Basic Skills Trainer, and Field Tactcial Trainer. The second Multi-Year covers the years 2000-2003.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROJECT NUMBER AND NAME **C1964 Anti-Armor Weapon System**

(U) D. SCHEDULE PROFILE:



Program Funding Summary

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
(U) RDT&E	0.413	0.608	0.630	0.000	0.000	0.000	0.000	0.000	Cont.	Cont.
(U) PMC BLI# 301100	92.512	28.852	1.036	0.000	0.000	0.000	0.000	0.000	0.000	Cont.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROJECT NUMBER AND NAME **C1964 Anti-Armor Weapon System**

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**				PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**26.345**	**12.998**	**18.203**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**57.546**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The LW155 is the replacement for the aging, operationally deficient M198 155 Howitzer for the Marine Corps and the Army. The LW155 retains the current M198 howitzer's range, but will weigh 9,000 pounds compared to the M198's 16,000 pounds. The weight reduction significantly improves transportability and mobility by sea, air, and land platforms and enables the LW155 to emplace, displace, and bold shift in half the time of the current system while increasing the rate of fire. Thus, the LW155 provides greater transportability and mobility in strategic/tactical movements. The LW155 is a joint Marine Corps and Army program, with the Marine Corps as the Lead service. The Joint Operational Requirements Document (JORD) was approved by the Assistant Commandant of the Marine Corps on 27 June 1996. The JORD was validated and approved by the Army on 29 September 1995. A MS I/II Marine Corps Program Decision Memorandum (MCPDM) was approved on 5 February 1996.

After a ten month “shoot-off” between competitors a three year EMD contract was signed with Cadillac Gage Textron Inc. on 17 March 1997. On 21 December 1998, the three parties involved in the development of the LW155 signed a novation agreement whereby Vickers Shipbuilding and Engineering Limited (VSEL) took over prime contractor responsibilities from Cadillac Gage Textron. The program will complete development in 4th quarter FY02 and enter production in FY 03. The Laser Ignition System (LIS) is to ignite the propelling charge for an artillery weapon systems without the aid of conventional primers. LIS will eliminate the need for primers and primer resupply, and increase response time.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS:

- (U) $ 3.010 Program Management Support.
- (U) $ 2.440 ARDEC continued matrix development engineering to system, logistics, safety, quality assurance, and corrosion prevention.
- (U) $ 9.836 Engineering and manufacturing development (EMD) contract increments to VSEL and Kara, Inc.
- (U) $ 1.333 Provided other government development engineering support to system, safety, logistics and quality assurance.
- (U) $ 3.894 Conducted technical test series (fatigue, recoil durability, cold, hot/humid, corrosion, transportability, logistics demonstration, spades, wear, firing tables).
- (U) $ 1.037 Conducted engineering and prototype manufacturing at Benet Labs and Watervliet Arsenal, NY.
- (U) $ 4.595 Forward Financed FY 01 EMD contract increments effort with VSEL.
- (U) $ 0.200 Forward Financed FY 01continued technical test series.

(U)Total $ 26.345

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	**0603635M Marine Corps Ground Combat/Supt Arms**	**C2112 Lightweight 155mm Howitzer (LW155)**

2. FY 2001 PLANS:

- (U) $ 1.971 Program Management Support.
- (U) $ 1.000 ARDEC completes matrix development engineering to system, logistics, safety, and quality assurance.
- (U) $ 5.127 EMD Contract increments to BAE Systems (formerly VSEL) & KARA.
- (U) $ 0.400 Provide other govt development engineering support to logistics and quality assurance.
- (U) $ 3.528 Provide support to Multi-service Operational Test & Evaluation (MOT&E) – Marine travel costs, transportation, materials & Developmental Testing (DT).
- (U) $ 0.800 ARDEC (Benet Labs) Conduct engineering and fabrication of GFE Primer Feed Mechanism.
- (U) $ 0.172 SBIR: Portion of extramural program reserved fro Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) $ 0.000 EMD contract increment to VSEL Forward Financed with FY 00 funds.
- (U) $ 0.000 Continued technical test series with FY 00 Forward Finance.

(U)Total $ 12.998

3. FY 2002 PLANS:

- (U) $ 0.853 Program Management Support.
- (U) $ 0.500 ARDEC completes matrix development engineering to system, logistics, safety, and quality assurance.
- (U) $ 0.500 ARDEC (Benet Labs) begins engineering support for Laser Ignition System.
- (U) $ 9.750 Complete EMD Contract (BAE Systems, formerly VSEL) and process close out to include the final award fee.
- (U) $ 1.500 Complete testing support for MOT&E.
- (U) $ 1.500 Begin TAD Integration for Laser Ignition System (BAE Systems).
- (U) $ 0.300 Purchase Test Hardware (6) from contractor – TBD for the Laser Ignition System.
- (U) $ 0.300 Conduct test on Ignition System at Yuma Proving Ground and other test sites
- (U) $ 3.000 Pre-production Planning/Manufacturing/Integration.

(U)Total $ 18.203

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**

Project Change Summary

	FY 2000	FY 2001	FY 2002
(U) Previous President's Budget	27.117	13.119	0.000
(U) Adjustments to Previous President's Budget			
SBIR/STTR Transfer	(0.527)		
Execution Adjustment	-		
Minor Affordability Adjustments	(0.094)	(0.121)	(0.297)
Program Adjustment	(0.151)		18.500
(U) Current Budget Submit	26.345	12.998	18.203

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Change shows schedule with delays.
(U) Technical: Not Applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
(U) PMC, BLI #218500, Howitzer, Medium Towed 155MM	0.000	11.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Cont.

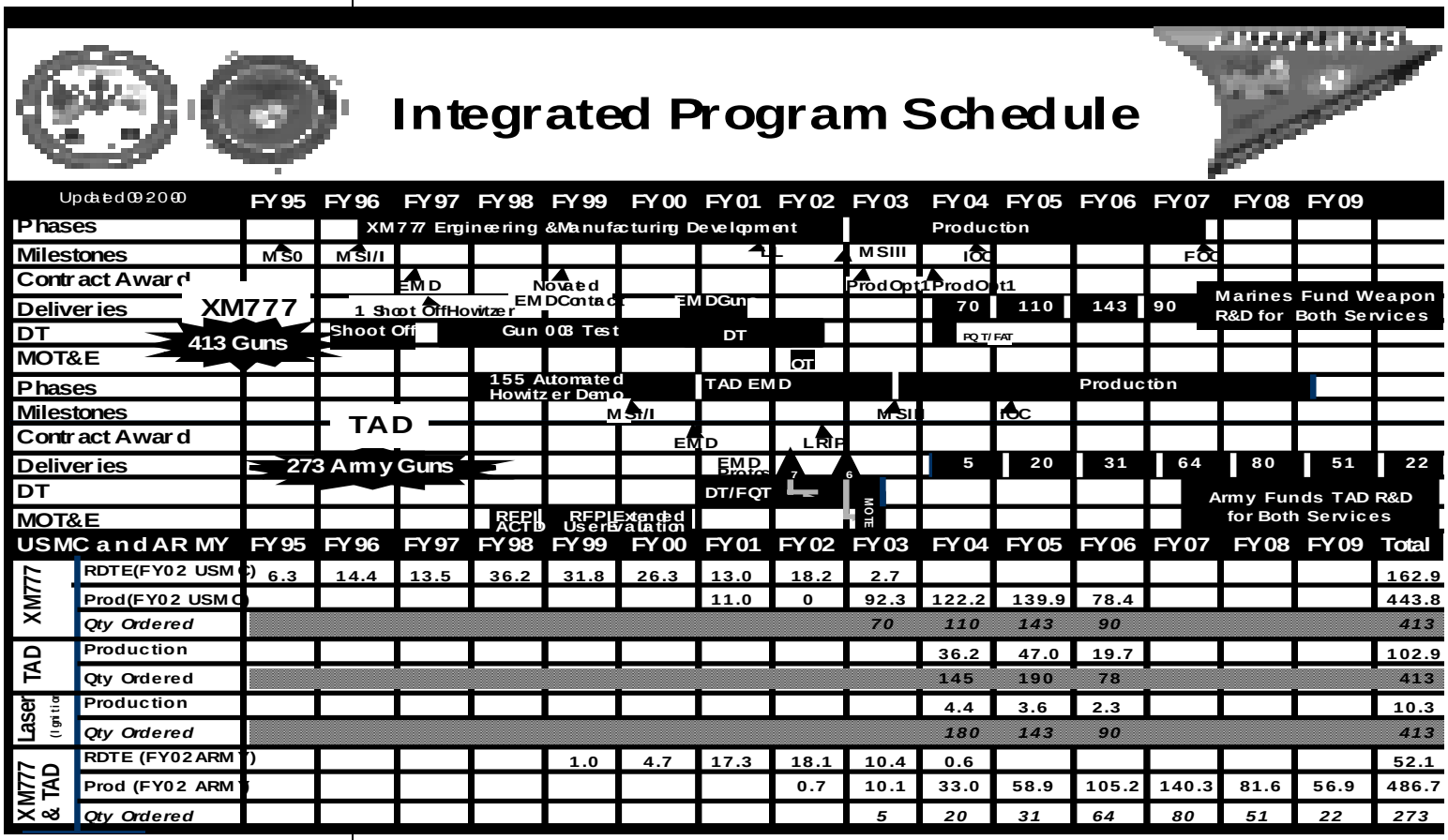
(U) Related RDT&E: PE 0604854A (Artillery Systems-Engineering Development)

(U) C. ACQUISITION STRATEGY:
The contract type initially was a Cost Plus Incentive Fee w/an Award Fee provision (CPIF/AF) for the EMD phase and was restructured to a CPIF in Dec 00 (Retroactive to Jun 00). Contract type is Fixed Price Incentive with Successive Targets (FPI-Successive) for the production options.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**

(U) D. SCHEDULE PROFILE:



CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT **0603635M Marine Corps Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development												
Primary Hardware Dev	CPIF	VSEL (BAE Sys), UK	18.958	12.911	03/00	4.552	02/01	11.250	10/01	0.500	48.171	
Ancillary Hardware Dev	CPIF	Kara, Bedford, PA	1.400	1.520	03/00	0.575	01/01	0.000		0.000	3.495	
Award Fees	CPIF	VSEL (BAE Sys), UK	0.316	0.000		0.000		0.000		0.000	48.171	
Laser Ignition Test	CPIF	TBD	0.000	0.000		0.000		0.300		0.300	0.600	
Mfg &Integr for Risk Mitig	CPIF	VSEL (BAE Sys), UK	0.000	0.000		0.000		3.000		0.000	3.000	
GFE	MIPR	Benet Labs Watervliet Arsenal NY	12.404	1.037		0.800		0.500		0.350	15.091	
Govt Dev Eng	MIPR	ARDEC	7.593	2.440		1.000		0.500		0.000	11.533	
Govt Dev Eng	MIPR	Misc	8.151	1.333		0.400		0.000		0.000	9.884	
Subtotal Product Dev			48.822	19.241		7.327		15.550		Continuing	Continuing	

Remarks:

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Support											0.000	
SBIR	TBD	TBD	0.000	0.000		0.172		0.000		0.000	0.172	
Support Contracts	Contract	Various	2.376	0.323		0.000		0.000		0.000	2.699	
Subtotal Support			2.376	0.323		0.172		0.000				

Remarks:

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT **0603635M Marine Corps Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2112 Lightweight 155mm Howitzer (LW155)**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Eval (T&E)												
Developmental Test & Eval	MIPR	Yuma Proving Ground, Yuma, AZ	2.960	4.017		2.562		1.800		1.550	12.889	
Developmental Test & Eval	MIPR	Misc. Government	3.406	0.026		0.000		0.000		0.000	3.432	
Operational Test & Eval	MIPR	MCOTEA	0.000	0.051		0.966		0.000		0.000	1.017	
Subtotal T&E			6.366	4.094		3.528		1.800		1.550	17.338	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Program Mngmnt												
Program Mngmnt	MIPR	PMO LW155, Picatinny, NJ	9.690	2.687		1.971		0.853		Continuing	Continuing	
Subtotal Management			9.690	2.687		1.971		0.853		Continuing	Continuing	
Remarks:												

Total Cost				26.345		12.998		18.203		Continuing	Continuing	

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arm**				PROJECT NUMBER AND NAME **C2256 Integrated Infantry Combat System**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**0.594**	**2.581**	**1.743**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The program will enhance the Marine's battlefield capabilities through the development and integration of an assortment of Marine systems/components and technologies into a cohesive, timely and combat effective system. These systems/components include weapon, integrated helmet assembly, protective clothing, communication and target acquisition technologies. This will provide the infantryman with increased lethality, survivability and situational awareness enhancements. Initial funding in this line will be utilized to determine and exploit integration opportunities on existing infantry equipment that will be fielded in the near future. Funds will also be utilized for the Research & Development of a future integrated system that is modular in design that will enhance the infantryman's mobility, lethality, survivability and communications. The IICS is an overarching program, consisting of three main phases. The initial phase enables base-lining current systems. The second phase consists of an iterative process integrating mid-term capabilities, and the final phase seeks technology insertions where opportunities exist.

PROGRAM ACCOMPLISHMENTS AND PLANS

FY 2000 Accomplishments:

- (U) $ 0.130 Provided program support and strategy development in support of phase one of the IICS program.
- (U) $ 0.140 Developed Modeling, Simulation and Analysis Decision Support System for baselining the Phase One efforts.
- (U) $ 0.324 Conducted studies and analysis in developing vignettes for input to modeling and simulation efforts.

(U) Total $ 0.594

FY 2001 Planned Program

- (U) $ 1.981 Congressional Plus-up for Advanced Modeling and Simulation – to be awarded following contractual competition.
- (U) $ 0.040 Prototype development by SBCCOM Natick, MA working integration issues with developing items of combat gear.
- (U) $ 0.107 Scenario development for representative MV-22 Heliborne Assault and subsequent Infantry Operations.
- (U) $ 0.229 Studies, analysis and support services for phase one activities.
- (U) $ 0.183 AAAV 18 hours Vignette development into IUSS Model for requirements and baseline analysis.
- (U) $ 0.041 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) Total $ 2.581

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N /BA-4 Demonstration/Validation	**0603635M Marine Corps Ground Combat/Supt Arm**	**C2256 Integrated Infantry Combat System**

FY 2002 Planned Program

- (U) $ 0.150 Prototype development by SBCCOM Natick, MA working integration issues with developing items of combat gear.
- (U) $ 0.150 Scenario development for representative AAAV Surface Assault and subsequent Infantry Operations.
- (U) $ 0.305 Support services
- (U) $ 0.288 Expeditionary Environment Studies (Nuclear Biological and Chemical, Mountain, Jungle, Extreme Cold Weather, Military Operations in Urban Terrain)
- (U) $ 0.850 Integration Development & Experimentation – R&D Integration of Command, Control, Communications, Computer, and Intelligence systems with weapons systems and load carriage equipment. Assessment of Land Warrior system in addressing these integration concerns

(U) Total $ 1.743

PROJECT CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	0.747	0.605	1.749
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-0.017		
(U) Execution Adjustment			
(U) Minor Affordability Adjustment	-0.003	-0.024	-0.025
(U) Program Adjustment	-0.133	2.000	0.019
(U) FY 2002 President's Budget:	0.594	2.581	1.743

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
Not Applicable.										

(U) Related RDT&E:

(U) PE 0602131M (Marine Corps Landing Force Technology)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstration)
(U) PE 64657A (Marine Corps Landing Force Technology)

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, N /BA-4 Demonstration/Validation	**0603635M Marine Corps Ground Combat/Supt Arm**	**C2256 Integrated Infantry Combat System**	

(U) C. ACQUISITION STRATEGY: * An explanation of acquistion, management, and contracting strategies shall be provided for each project.

The Intergrated Infantry Combat System envisions a phased approach of enhancements to the rifle squad with an endstate of synergizing that squad as a "system." Modularity and integration are paramount design factors. By improving the equipment and making it modular in form, by integrating these individual improvements into the squad as a whole, and by completing this via a phased approach, we can manage the risks associated with technology creep and cost.

(U) D. SCHEDULE PROFILE: Not Applicable.

Program Funding Summary	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(APPN, BLI #, NOMEN)										
(U) RDT&E,N										
(U) PMC, BLI#										

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2256 Integrated Infantry Combat System**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT												
Primary Hardware Dev											0.000	
Ancillary Hardware Dev											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
	MIPR	Batelle Corp., Columbus, OH	0.000	0.082	04/00	0.112	10/00	0.150	11/01	0.150	0.494	
	MIPR	SBCCOM, NATICK	0.000	0.085	05/00	0.040	01/01	0.150	12/01	Continuing	Continuing	
	MIPR	SAIC, Corp	0.000	0.297	06/00	0.150	10/00	0.263	12/01	Continuing	Continuing	
	RCP	MCSC Contracts	0.000	0.000		1.981	05/01	0.850	10/01	Continuing	Continuing	
Subtotal Product Dev			0.000	0.464		2.283		1.413		Continuing	Continuing	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
SUPPORT												
Development Support Equip											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
SUPPORT												
Configuration Management											0.000	
Technical Data											0.000	
	RCP	ALS, Inc.	0.036	0.100	10/99					0.000	0.136	
	RCP	Bae, Inc.	0.000	0.000		0.204	10/00	0.225	10/01	Continuing	Continuing	

Subtotal Support			0.036	0.100		0.204		0.225			0.565	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2256 Integrated Infantry Combat System**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
T&E												
Developmental Test & Eval											0.000	
Operational Test & Eval											0.000	
Tooling											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		Continuing	Continuing	
Remarks:												
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
MANAGEMENT												
Prog Mgmt Spt	RCP	Bae, Inc.	0.000	0.000		0.068	10/00	0.075	10/01	Continuing	Continuing	
Travel	WR	MCSC		0.030	10/99	0.026	10/00	0.030	10/01	Continuing	Continuing	
Subtotal Management			0.000	0.030		0.094		0.105		0.000	0.229	
Remarks:												
Total Cost				0.594		2.581		1.743		Continuing	Continuing	

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**				PROJECT NUMBER AND NAME **C2507 Family of Small Craft**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**1.395**	**1.741**	**2.930**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**6.066**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The Small Unit Riverine Craft (SURC) will provide tactical mobility as a troop carrier for elements of a Marine Air Ground Task Force (MAGTF) Ground Combat Element (GCE) in the Riverine Environment. The SURC will replace the Rigid Raiding Craft (RRC) which was fielded 12 years ago. It will augment the larger Riverine Assault Craft (RAC) in riverine operations to include troop transport, troop insertion, and extraction, convoy ops, and application of fires.

(U) The Light Strike Craft (LSC) will be the primary mobility platform for Marine Small boat operations in support of Operational Maneuver From the Sea (OMFTS). The LSC will replace a portion of the Combat Rubber Reconnaissance Craft (CRRC), a craft that was not designed for long range over-the-horizon operations.

PROGRAM ACCOMPLISHMENTS AND PLANS

FY 2000 Accomplishments:

- (U) $ 0.152 Conducted system design and research (ballistic protection, hull component, obscurant systems, engines).
- (U) $ 0.318 Designed Developmental Test Plan.
- (U) $ 0.112 Conducted Acoustic Testing on similar craft for baseline data.
- (U) $ 0.372 Conducted Design modeling.
- (U) $ 0.371 Conducted Scenario simulation for conventional Riverine operations.
- (U) $ 0.070 Provided Government Project Management and Documentation Support for the SURC Program.

(U) Total $ 1.395

FY 2001 Planned Program

- (U) $ 0.552 Continue Integration and Testing of Non Developmental Item (NDI) System Components / Performance & Functioning Testing.
- (U) $ 0.752 Fabrication of Developmental Testing (DT) Prototype Craft / Fabrication of Gun Mount.
- (U) $ 0.300 Continue System Analysis / finalize Prototype Development and Commercial Design / and execution of Developmental Testing Plan.
- (U) $ 0.093 Continue Government Project Management Office support for the SURC Program.
- (U) $ 0.044 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) Total $ 1.741

FY 2002 Planned Program

- (U) $ 0.125 Design and test of mobility support equipment for Landing Craft Air Cushioned (LCAC), CH-53 Helicopter, Sealift.
- (U) $ 1.655 Fabrication of Operational Test (OT) Prototype craft.
- (U) $ 1.075 Operational Test and Eval/ Certification and safety testing.
- (U) $ 0.075 Program Support.

(U) Total $ 2.930

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2507 Family of Small Craft**

PROJECT CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	3.021	1.757	0.225
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-0.001		
(U) Execution Adjustment	-0.021		
(U) Minor Affordability Adjustment	-0.012	-0.016	-0.070
(U) Program Adjustment	-1.592		2.775
(U) FY 2002 President's Budget:	1.395	1.741	2.930

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) PMC BLI#643400 Amphib Raid Equip	0.000	0.000	2.349	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) Related RDT&E: Not Applicable.

(U) C. ACQUISITION STRATEGY: * An explanation of acquisition, management, and contracting strategies shall be provided for each project.

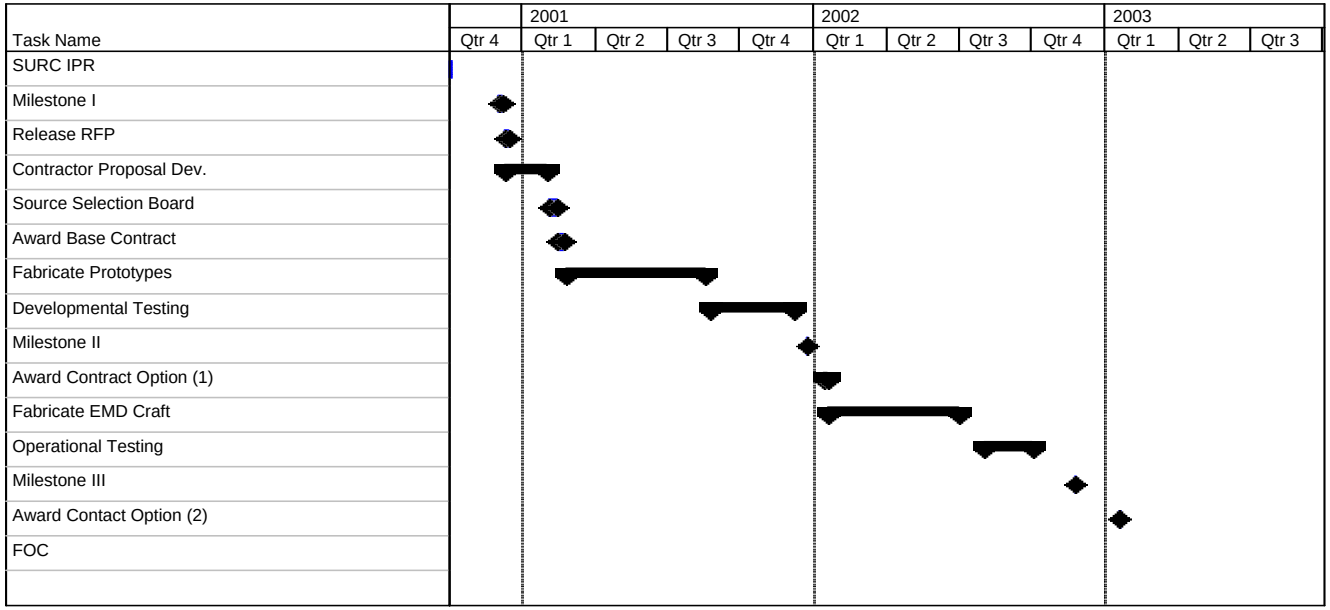
The acquisition strategy consists of a market survey to identify Off-The-Shelf / Non-Developmental ItemI baseline competitors. This will be followed by a release of desired capabilities/specifications and establishment of the trade space parameters. Currently, we anticipate a dual-stage downselect. The program is poised for the purchase of prototypes but is being held while programmatic insights are being gleaned from a the Marine Corps Systems Command's purchase of Commercial Off-The-Shelf forklifts.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2507 Family of Small Craft**

(U) D. SCHEDULE PROFILE:

SMALL UNIT RIVERINE CRAFT (SURC)



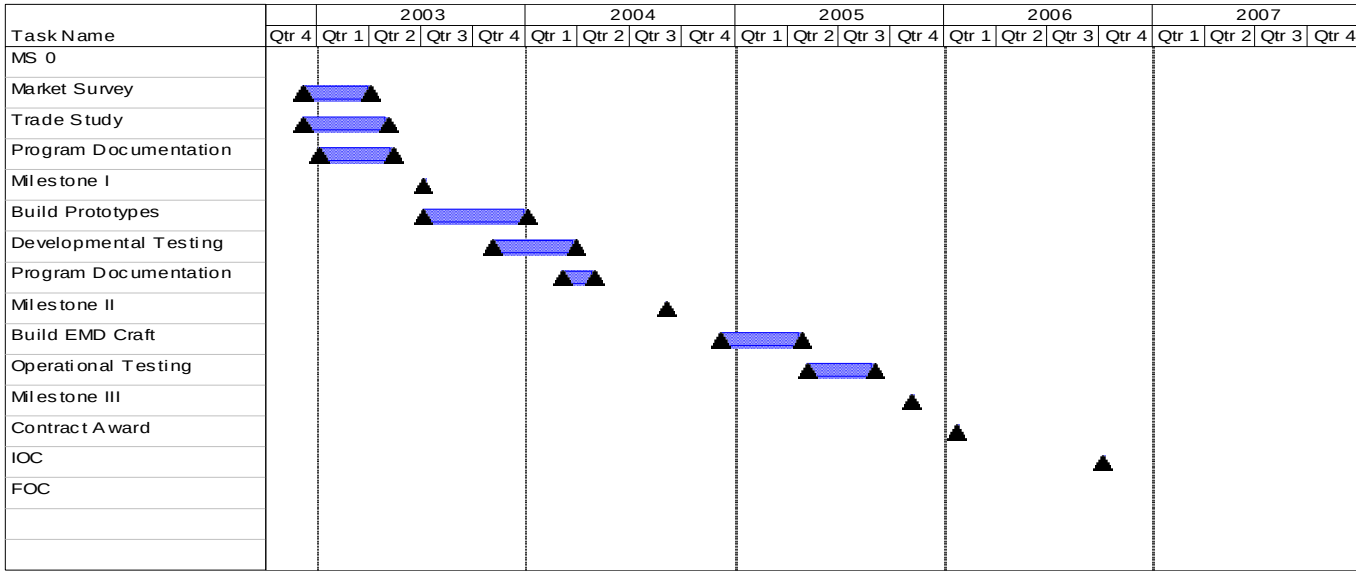
Program Funding Summary (APPN, BLI #, NOMEN)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) RDT&E,N	1.395	1.741	2.930	0.000	0.000	0.000	0.000	0.000	0.000	6.066
(U) PMC,BLI#643400,Amphib Raid Eq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2507 Family of Small Craft**

(U) D. SCHEDULE PROFILE:

LIGHT STRIKE CRAFT (LSC)



Program Funding Summary (APPN, BLI #, NOMEN)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) RDT&E,N	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(U) PMC,BLI#643400,Amphib Raid Eq (LSC)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2507 Family of Small Craft**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEV												
Primary Hardware Dev											0.000	
Ancillary Hardware Dev											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
	WR	NSWC Carderock, Suffolk,VA	0.000	1.227	12/99	0.552	10/00	0.300	10/01	Continuing	Continuing	
	WR	NSWC Carderock, Suffolk,VA	0.000	0.075	12/99	0.800	10/00	1.780	10/01	Continuing	Continuing	
Subtotal Product Dev			0.000	1.302		1.352		2.080		Continuing	Continuing	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
SUPPORT												
Development Support Equip											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
	RCP	ALS BAE Inc., Triangle, VA	0.000	0.040	10/99	0.089	10/00	0.075	10/01	Continuing	Continuing	
Subtotal Support			0.000	0.040		0.089		0.075				
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2507 Family of Small Craft**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Eval											0.000	
T&E												
Operational Test & Eval											0.000	
Tooling											0.000	
	WR	NSWC, Carderock, Suffolk, VA	0.000	0.053	12/99	0.300	10/00	0.775	10/01	Continuing	Continuing	
Subtotal T&E			0.000	0.053		0.300		0.775		Continuing	Continuing	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
MANAGEMENT												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost				1.395		1.741		2.930		Continuing	Continuing	

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**				PROJECT NUMBER AND NAME **C2508 Internally Transportable Vehicle (ITV)**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**4.897**	**6.570**	**2.451**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**13.918**
RDT&E Articles Qty		**8**								

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Internally Transportable Vehicles (ITV) program was previously known as the Light Strike Vehicle (LSV) program. This project develops a joint MV-22 aircraft transportable family of light tactical, wheeled vehicles. The ITV's will provide reconnaissance units with a high mobility weapons platform. Follow-on variants will address logistics, command and control, medical and personnel movement missions. The ITV will replace the Fast Attack Vehicles (FAVs) currently employed throughout the Marine Air Ground Task Force (MAGTF).

PROGRAM ACCOMPLISHMENTS AND PLANS

FY 2000 Accomplishments:

- (U) $ 4.200 Forward Finance of Demonstration and Validation for two contractors. The Milestone Decision Authority (MDA) changed the Acquisition Strategy from a developmental item to a Non-Developmental Item (NDI) Strategy resulting in a reduction of $9.3M over the FYDP.
- (U) $ 0.628 Provided associated engineering efforts in support of Dem/Val.
- (U) $ 0.019 Provided In House program management and travel.
- (U) $ 0.050 Prepared for automotive test rig testing.

(U) Total $ 4.897

FY 2001 Planned Program

- (U) $ 4.869 Complete Demonstration and Validation for FY 2000 and FY 2001 funds.
- (U) $ 0.086 Provide In House program management and travel.
- (U) $ 0.430 Provide Engineering and Logistic Support.
- (U) $ 0.131 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) $ 1.054 Conduct Automotive, Aircraft, Weapons, and Reliability testing.

(U) Total $ 6.570

FY 2002 Planned Program

- (U) $ 1.600 Refurbish vehicles, begin mission role variant development.
- (U) $ 0.400 Conduct IOT&E and aircraft certification testing.
- (U) $ 0.058 Provide In House program management and travel.
- (U) $ 0.393 Provide Engineering and Logistic Support.

(U) Total $ 2.451

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N /BA-4 Demonstration/Validation	**0603635M Marine Corps Ground Combat/Supt Arms**	**C2508 Internally Transportable Vehicle (ITV)**

PROJECT CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	5.196	6.630	6.073
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-0.007		
(U) Execution Adjustment	-0.286		
(U) Minor Affordability Adjustment	-0.006	-0.060	-0.049
(U) Program Adjustment			-3.573
(U) FY 2002 President's Budget:	4.897	6.570	2.451

CHANGE SUMMARY EXPLANATION:

(U) Funding: See Above.

(U) Schedule: Engineering Manufacturing Development (EMD) phase of program combined into DEM/VAL for one R&D program phase. IOC planned for FY03.

(U) Technical: Implementation of a Non-Developmental acquisition strategy, early delivery of test articles, and greater testing with a "fly before buy" strategy.

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) PMC BLI# 654500 Family of ITV	0.000	0.000	4.852	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

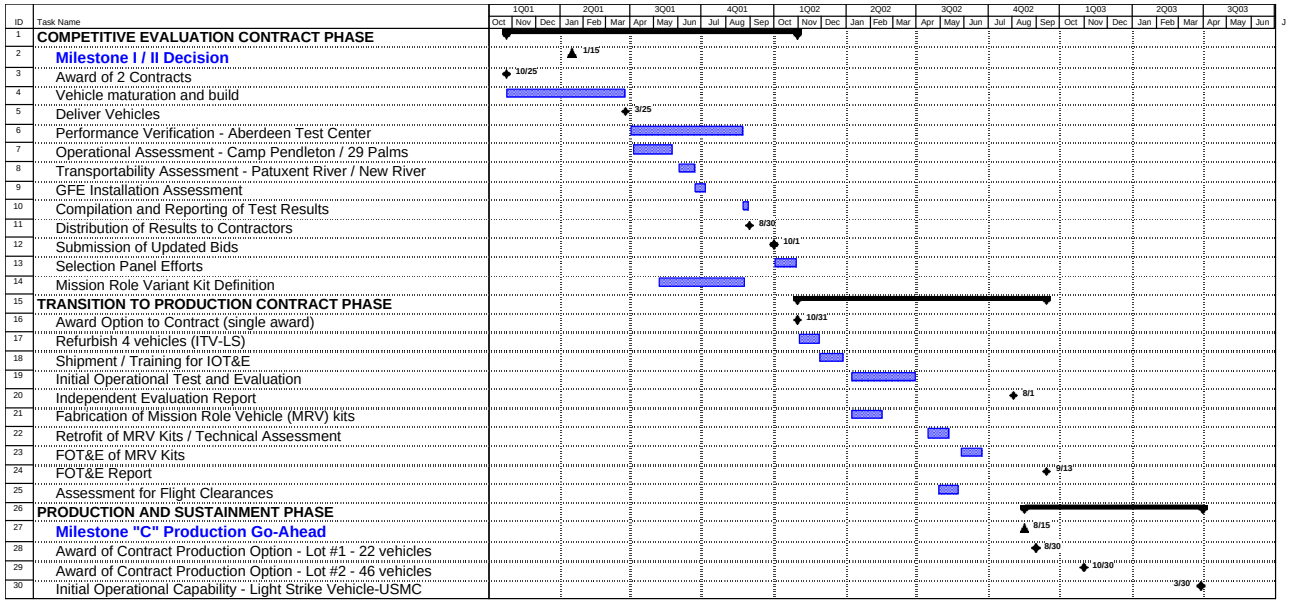
(U) Related RDT&E: USSOCOM joint participation in ITV program – USSOCOM funding applied toward their mission specific vehicle variants.

(U) C. ACQUISITION STRATEGY: The program is full and open competition, looking for the "best value" approach to satisfy the operational requirements. The program has both an Acquisition Strategy and an Acquisition Plan that addresses the total program fielding. Following solicitation, one contractor will be selected to perform any necessary analyses on their ITV base chassis and family of vehicle definition. The contractor will deliver 8 prototypes in FY 00 for verification testing prior to Initial Operational Test and Evaluation on the weapons carrier version. Follow-on testing will take place in FY 02, prior to start of purchase of vehicles in FY 03 for approximately 866 vehicles (33% of the procurement objective). 33% of the fleet will be procured in each year of FY 04 and FY 05.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2508 Internally Transportable Vehicle (ITV)**

(U) D. SCHEDULE PROFILE:



Program Funding Summary (APPN, BLI #, NOMEN)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) RDT&E,N	4.897	6.570	2.451	0.000	0.000	0.000	0.000	0.000	0.000	13.918
(U) PMC BLI# 654500 Family of ITV			4.852	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2508 Internally Transportable Vehicle (ITV)**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Dev											0.000	
Ancillary Hardware Dev											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
	RCP	MCSC	0.000	4.200	10/00	5.000	02/01	1.600	10/01	0.000	10.800	
Subtotal Product Dev			0.000	4.200		5.000		1.600		0.000	10.800	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Development Support Equip											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
	WR	NSWC, Carderock	0.000	0.346		0.100		0.100		0.000	0.546	
	MIPR	WES Army Eng	0.000	0.075		0.050		0.000		0.000	0.125	
	WR	NAWC, AD	0.000	0.075		0.100		0.093		0.000	0.268	
	WR	NSWC Crane	0.000	0.035		0.000		0.000		0.000	0.035	
	WR	MCSC	0.000	0.056		0.086		0.058		0.000	0.200	
	MIPR	TACOM (PM)	0.000	0.060		0.180		0.200		0.000	0.440	
Subtotal Support			0.000	0.647		0.516		0.451		0.000	1.614	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2508 Internally Transportable Vehicle (ITV)**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Eval											0.000	
Operational Test & Eval											0.000	
Tooling											0.000	
	MIPR	APG, Test Center	0.000	0.050		0.854		0.250			1.154	
	WR	NAWC, AD	0.000	0.000		0.200		0.150			0.350	
Subtotal T&E			0.000	0.050		1.054		0.400		0.000	1.504	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Contractor Eng Suppt											0.000	
Govt Engineering Suppt											0.000	
Program Mngmnt Suppt											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost				4.897		6.570		2.451		0.000	13.918	

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**				PROJECT NUMBER AND NAME **C2614 SMAW Follow-on**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**2.922**	**2.972**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont.**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

FOTS is an accurate, lightweight, assault weapon designed to defeat a variety of targets on the battlefield. It consists of a launcher, sighting and fire control system, and projectile. FOTS will replace the Shoulder-Launcher Multi-Purpose Assault Weapon (SMAW) without loss of present capabilities while providing: 1) fire from enclosure capability, 2) reduced launcher signature, 3) increased lethality, 4) greater breaching effects, 5) lighter weight, 6) increased reliability, and 7) increased availability.

PROGRAM ACCOMPLISHMENTS AND PLANS

FY 2000 Accomplishments:

- (U) $ 0.308 International Business Strategy Analysis Conducted.
- (U) $ 1.300 Continue propulsion system technology (fire from enclosure) demonstration effort.
- (U) $ 0.012 Provided govt. Program Management / In-House Support.
- (U) $ 0.007 Provided govt. Engineering and Technical Support.
- (U) $ 1.295 Forward Financed activities into FY 01.

(U) Total $ 2.922

FY 2001 Planned Program: See Note (*)

- (U) $ 2.000 Continue Warhead Development/Risk Reduction.
- (U) $ 0.602 Provide govt. Program Management / In-House Support.
- (U) $ 0.306 Provide govt. engineering and technical support.
- (U) $ 0.000 *$1295 Forward Financed activities from FY 00 to complete propulsion system technology (fire from enclosure) demonstration effort.
- (U) $ 0.064 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) Total $ 2.972

FY 2002 Planned Program

- (U) $ 0.000 Not Applicable

(U) Total $ 0.000

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2614 SMAW Follow-on**

PROJECT CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	2.984	0.000	0.000
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer			
(U) Execution Adjustment			
(U) Minor Affordability Adjustment	-0.062	-0.028	
(U) Program Adjustment		3.000	
(U) FY 2002 President's Budget:	2.922	2.972	0.000

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) 220900; Mod Kits:Arty&Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Cont.	Cont.

(U) Related RDT&E: Not Applicable.

(U) C. ACQUISITION STRATEGY:

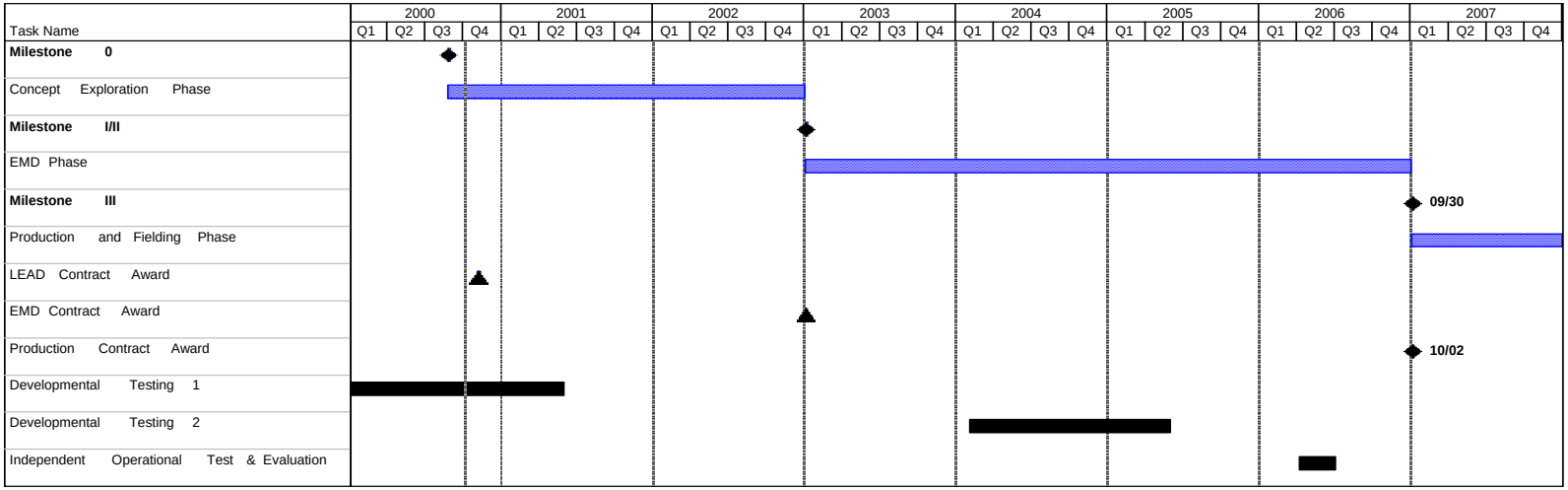
The acquisition strategy for Follow-On-To-Shoulder Mounted Assault Weapon (FOTS) represents a fundamental shift from the traditional military systems acquisition paradigm in which external market demand is leveraged by offering a fully developed system to external markets. Rather, the FOTS acquisition will strive to let the market place influence the determination of the ultimate design of the weapon. The concept and technology phase will be sole source, cost plus fixed fee. System development and demonstration phase will be full and open competition, cost plus fixed fee.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603635M Marine Corps Ground Combat/Supt Arms**	PROJECT NUMBER AND NAME **C2614 SMAW Follow-on**

(U) D. SCHEDULE PROFILE:

FOLLOW ON TO SMAW (FOTS)



Program Funding Summary	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) RDT&E,N	2.922	2.972	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.894
(U) 220900; Mod Kits:Arty&Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2614 SMAW Follow-on**					
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT												
Primary Hardware Dev											0.000	
Ancillary Hardware Dev											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
	SS/RCP	CMS Defense Systems,Titusville,FL	2.400	0.200	12/99	0.000		0.000		0.000	2.600	
	SS/RCP	InvenCom Inc., Charlotte, NC	0.000	1.300	08/00	0.000		0.000		0.000	1.300	
	C/RCP	TBD Contractor	0.000	0.000		2.000	12/00	0.000		Continuing	Continuing	
Subtotal Product Dev			2.400	1.500		2.000		0.000		Continuing	Continuing	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
SUPPORT												
Development Support Equip											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
	WR/RCP	NSWC, Dahlgren, VA	1.300	0.907	12/99	0.370	12/00	0.000		Continuing	Continuing	
	RCP	ALS Inc.,Dumfries, VA	0.005	0.022	12/99					0.000	0.027	
	RCP	Telecolote Inc., Huntsville, AL	0.000	0.124	06/00	0.000		0.000		0.000	0.124	
		TBD		0.073		0.492		0.000		0.000	0.565	
Subtotal Support			1.305	1.126		0.862		0.000		0.000	0.716	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Dem/Val**		PROGRAM ELEMENT **0603635M MC Ground Combat/Supt Arms**					PROJECT NUMBER AND NAME **C2614 SMAW Follow-on**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Eval											0.000	
T&E												
Operational Test & Eval											0.000	
Tooling											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		Continuing	Continuing	
Remarks:												
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
MANAGEMENT												
	WR	MCSC, Quantico, VA	0.000	0.296	06/00	0.110		0.000		0.000	0.406	
Subtotal Management			0.000	0.296		0.110		0.000		0.000	0.406	
Remarks:												
Total Cost				2.922		2.972		0.000		Continuing	Continuing	

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Joint Service EOD Development/0603654N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**10.821**	**14.546**	**12.918**						**Cont.**	**Cont.**
Joint Service EOD Systems/Q0377	**5.848**	**7.533**	**6.069**						**Cont.**	**Cont.**
EOD Diving System/Q1317	**4.973**	**7.013**	**6.849**						**Cont.**	**Cont.**
Quantity of RDT&E Articles	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**		

A. Mission Description and Budget Item Justification: This is a Joint Service Program. This program provides for the development of Explosive Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Proliferation of sophisticated types of foreign and domestic ordnance necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render-safe and dispose of sea mines and other underwater ordnance.

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	11.107	13.131	12.876
Appropriated Value:	11.168	14.681	
Adjustment to FY 2000/2001 Appropriated Value/ FY2001 Presidents Budget:			
a. SBIR Adjustment	-0.227		
b. General Adjustments	-0.120	-0.135	0.042
FY 2002 PRES Budget Submit:	10.821	14.546	12.918

Funding: FY 00 and FY 01 decreases are due to general adjustments. FY 02 increase is due to minor pricing adjustments.

Schedule: Not applicable for Q0377 or Q1317.

Technical: Not applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development/0603654N**				PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**5.848**	**7.533**	**6.069**							
RDT&E Articles Qty	**Various**	**Various**	**Various**							

A. Mission Description and Budget Item Justification: Provides Explosive Ordnance personnel of all military services with the specialized equipment and tools required to support their mission of detection/location, identification, render-safe, recovery, field and laboratory evaluation, and disposal of unexploded ordnance (UXO) that is a threat to military operations, installations, personnel, or material. UXO includes foreign and domestic, both conventional and non-conventional, including improvised explosive devices (IEDs).
(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY2000 ACCOMPLISHMENTS:
($.900) Obtained Milestone III decision for Lightweight Disposable Disrupter (LIDD) project.
($3.240) Continued development of the Classified Project II, Small Caliber Dearmer (SCD) and Standoff Disrupter (SD) projects.
($1.308) Initiated the Large Improvised Explosive Device (IED) Access and Disruption project.
($.400) Conducted Analysis of Alternative studies for the Explosive Safe/Arm (ESA) Monitor and EOD Incident Site C4 (ISC4) System projects.

2. FY2001 PLAN:
($1.900) Obtain approval for full rate production for Small Caliber Dearmer project and the Standoff Disrupter UXO and Standoff Disrupter IED projects.
($3.425) Continue development of Large IED Access and Disruption, Classified Project II and initiate the EOD ISC4 System project.
($.500) Conduct Analysis of Alternatives studies in the areas of submunitions clearance and hand held ordnance locator (Advanced Ordnance Locator).
($1.550) Develop and test improvements to the Remote Ordnance Neutralization System (RONS).
($.158) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2002 PLAN:
($3.200) Continue Classified Project II, Large IED Access & Disruption and EOD ISC4 projects.
($2.369) Initiate Advanced Ordnance Locator (AOL), Non-invasive Filler Identification (NFI), and EOD Man Portable Robotic System (MPRS) projects.
($.500) Conduct Analysis of Alternative studies in the area of submunitions clearance. Conduct evaluations of Commercial/Non-Developmental Item (C/NDI) EOD tools & equipment.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**JT Service EOD Development 0603654N**	JT Service EOD Systems/Q0377	

B. Other Program Funding Summary:

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
OPN 5509	1.568	0.614	1.458						CONT.	CONT.
PANMC 0340	0.234	0.563							0.000	0.797

C. Acquisition Strategy: Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

D. Schedule Profile: See Attached.

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EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N Joint Service EOD Development; Q0377 Joint Service EOD Systems

RDT&E Milestone Chart

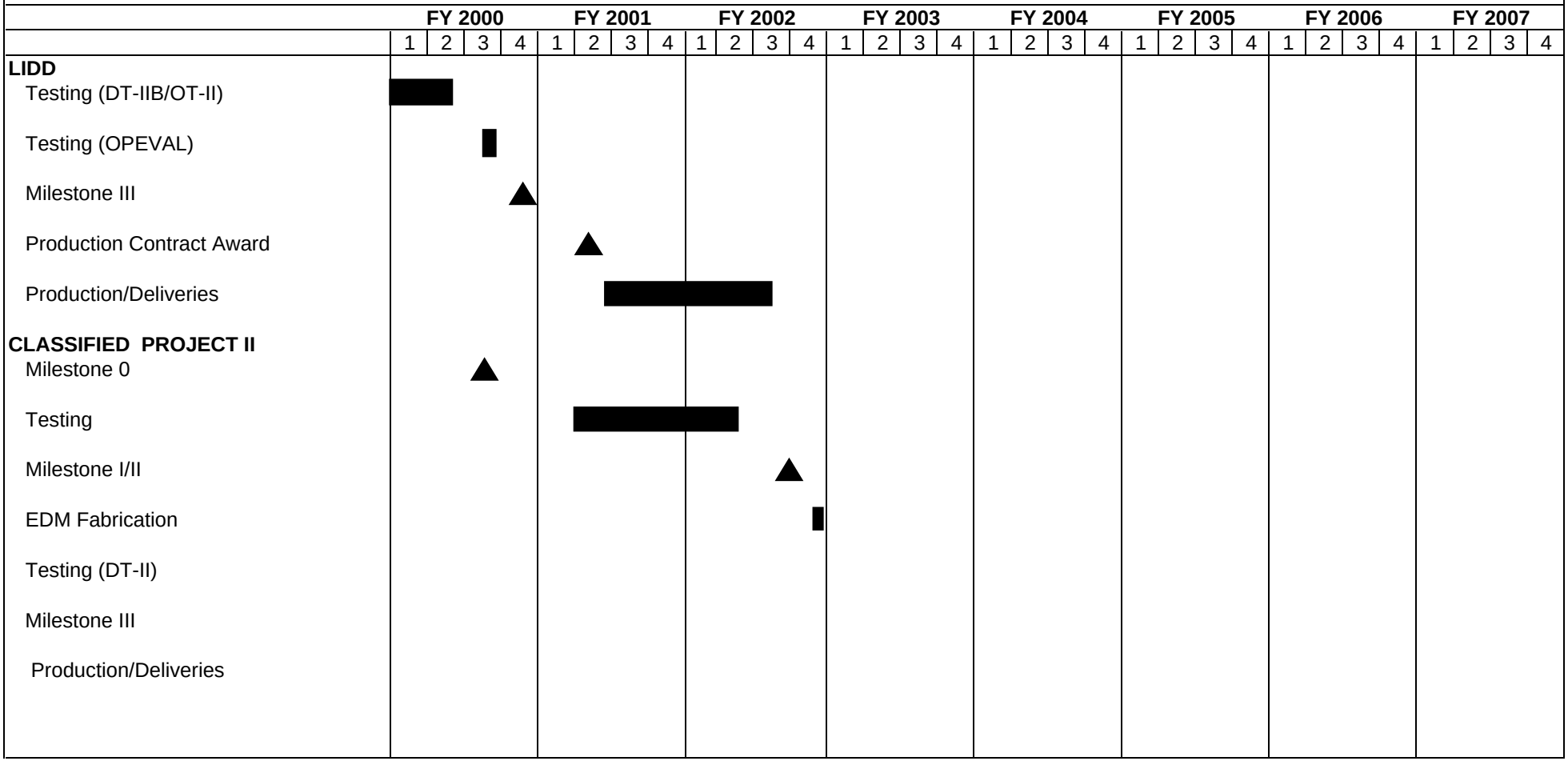

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N Joint Service EOD Development; Q0377 Joint Service EOD Systems

RDT&E Milestone Chart

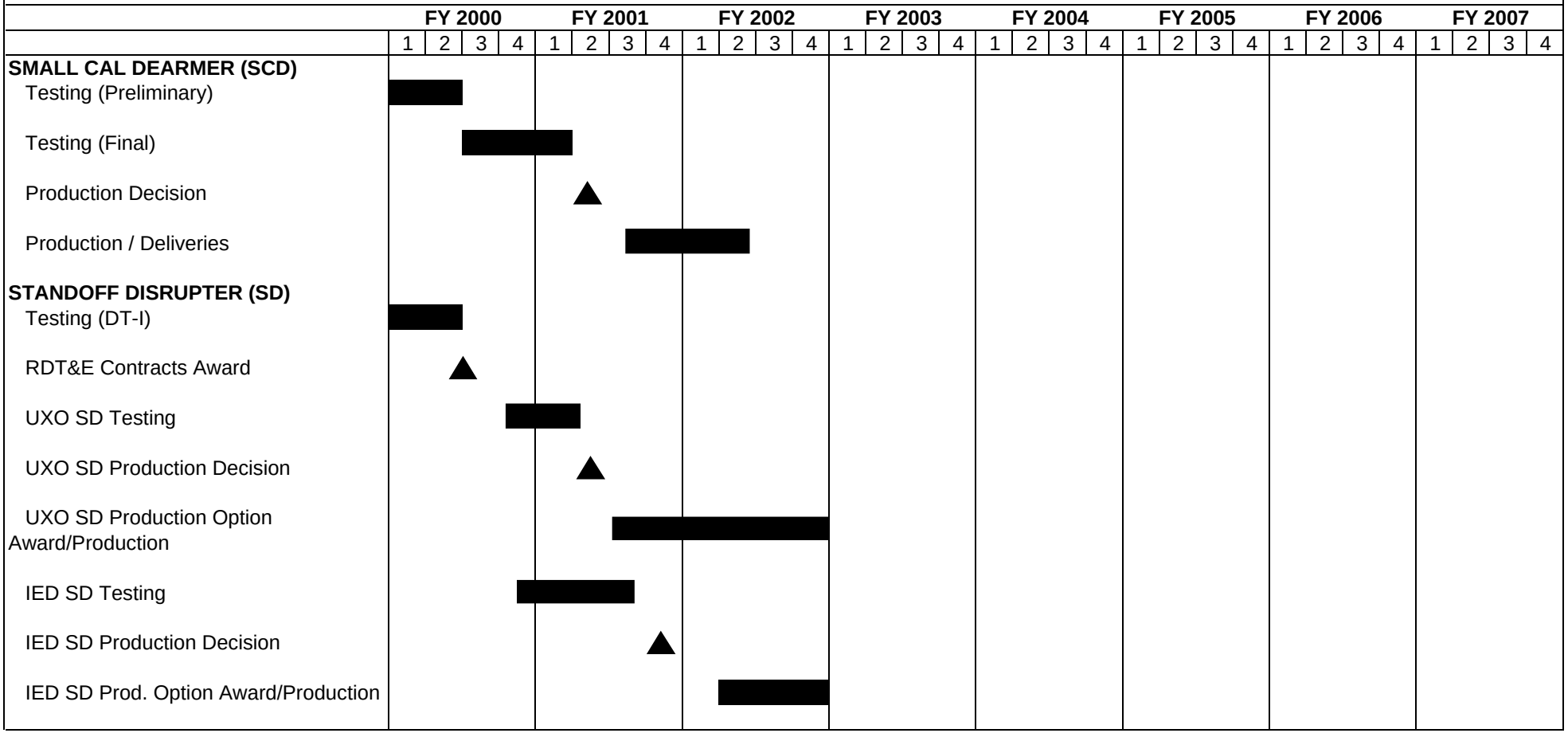

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N Joint Service EOD Development; Q0377 Joint Service EOD Systems

RDT&E Milestone Chart

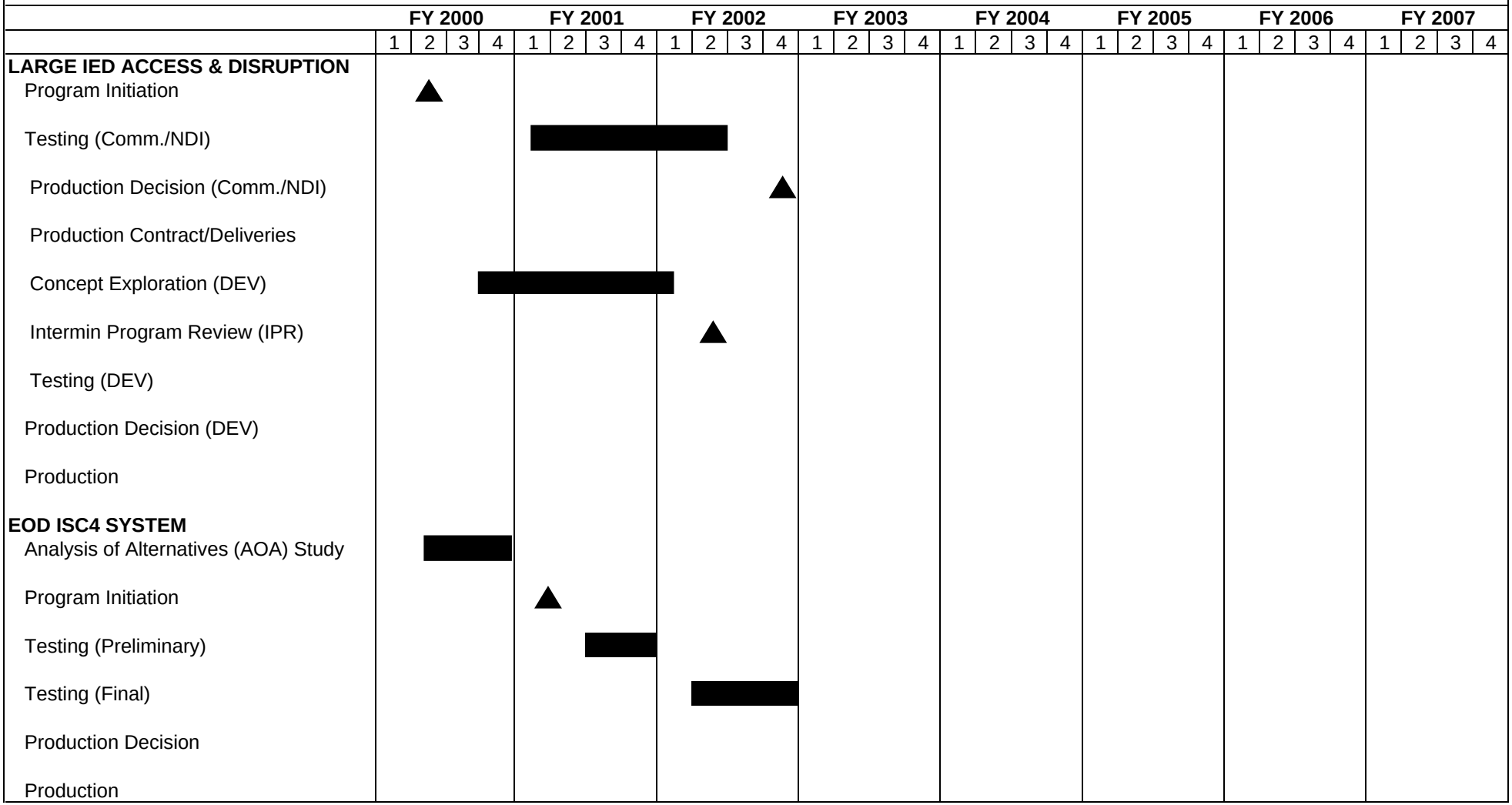

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N Joint Service EOD Development; Q0377 Joint Service EOD Systems

RDT&E Milestone Chart

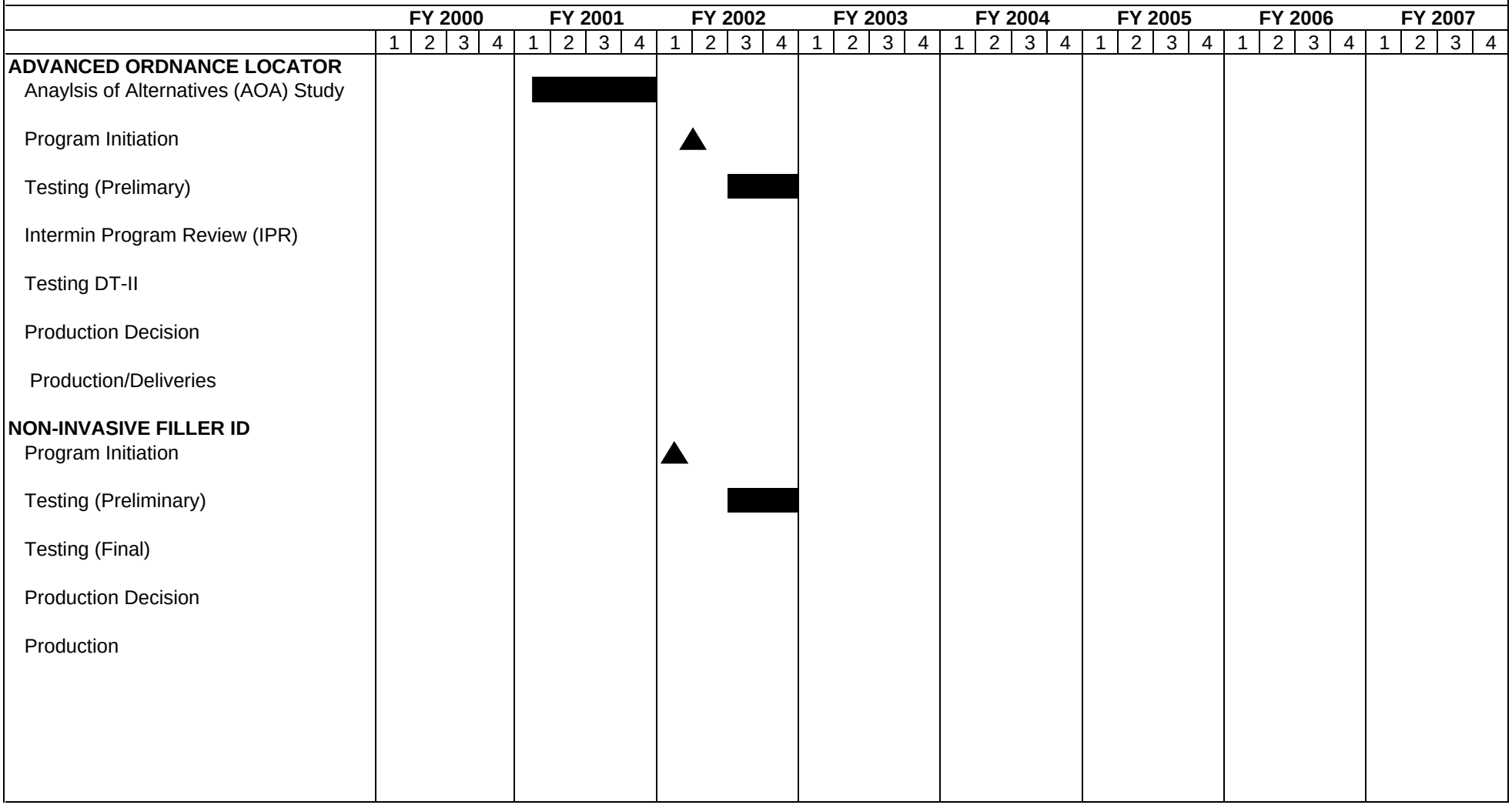

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N Joint Service EOD Development; Q0377 Joint Service EOD Systems

RDT&E Milestone Chart

	FY 2000				FY 2001				FY 2002				FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EOD MAN PORTABLE ROBOTIC SYSTEM																																
Program Initiation											▲																					
Testing (Preliminary)																																
Testing (Final)																																
Production Decision																																
Production																																

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **0603654N**				PROJECT NAME AND NUMBER Joint Service EOD Systems/Q0377						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	EODTD, IH, MD	71.567	2.484	10/99	3.338	10/00	2.102	10/01	Continuing	Continuing	N/A
Software Development	WR	EODTD, IH, MD	3.304			0.075	10/00			Continuing	Continuing	N/A
ILS	WR	EODTD, IH, MD	33.360	0.910	10/99	0.850	10/00	0.900	10/01	Continuing	Continuing	N/A
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Product Development			108.231	3.394		4.263		3.002		Continuing	Continuing	N/A
Remarks:												
Program Management Support	C/CPFF	Dynamic Systems, Alex, VA	2.340	0.340	01/00	0.250	01/01	0.260	01/02	Continuing	Continuing	N/A
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			2.340	0.340		0.250		0.260		0.000	3.190	N/A
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **0603654N**				PROJECT NAME AND NUMBER Joint Service EOD Systems/Q0377						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	EODTD, IH, MD	50.108	1.050	10/99	1.895	10/00	1.650	10/01	Continuing	Continuing	N/A
Operational Test & Evaluation	WR	EODTD, IH, MD	8.135	0.110	10/99					Continuing	Continuing	N/A
											0.000	
											0.000	
Subtotal T&E			58.243	1.160		1.895		1.650		Continuing	Continuing	N/A
Remarks:												
Program Management Personnel	WR	EODTD, IH, MD	3.220	0.225	10/99	0.225	10/00	0.250	10/01	Continuing	Continuing	N/A
Miscellaneous	Various	Various	1.566	0.729	02/00	0.900	02/01	0.907	02/02	Continuing	Continuing	N/A
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			4.786	0.954		1.125		1.157		Continuing	Continuing	N/A
Remarks:												
Total Cost			173.600	5.848		7.533		6.069		Continuing	Continuing	N/A
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development/0603654N**				PROJECT NAME AND NUMBER EOD Diving Systems/Q1317					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**4.973**	**7.013**	**6.849**						**Cont.**	**Cont.**
RDT&E Articles Qty	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**		

A. Mission Description and Budget Item Justification: Provides for development of diving equipment and explosive charges to support Explosive Ordnance Disposal (EOD) underwater operations. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render-safe, and dispose of sea mines and other underwater ordnance. Provides support for the Navy's high priority mission of Very Shallow Water (VSW) mine countermeasures, including clandestine reconnaissance, in support of amphibious operations. This also includes the development of small, affordable MCM Unmanned Underwater Vehicles.
(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY2000 ACCOMPLISHMENTS:
($.370) Continued developing equipment which improves diver capability and endurance.
($.853) Continued developing a non-magnetic Acoustic Firing System.
($.879) Continued developing non-magnetic Underwater Imaging System to detect objects in the water column.
($.434) Initiated the development of diving tables for the MK 16 MOD 0 Underwater Breathing Apparatus.
($2.437) Continued to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSW MCM Detachment (USN/USMC).

2. FY2001 PLAN:
($.181) Test & gain approval for Navy use (ANU) of EOD diving, Commercial/Non-Developmental Items (C/NDI).
($.885) Continue developing a non-magnetic Acoustic Firing System.
($.709) Obtain production decision for Underwater Imaging System.
($.564) Complete the development of diving tables for the MK 16 MOD 0 Underwater Breathing Apparatus.
($.083) Conduct Analysis Of Alternatives for equipment to enhance the divers ability to detect, neutralize and gather intelligence on underwater limpet and special attach mines.
($4.435) Continue to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSW MCM Detachment (USN/USMC). This also includes the development of small, affordable MCM Unmanned Underwater Vehicles Systems & UUV Modules for VSW MCM & EOD Detachments.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**JT Service EOD Development/0603654N**	EOD Diving Systems/Q1317

($.156) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY2002 PLAN:
($.212) Continue to test & gain approval for Navy use (ANU) of EOD diving, Commercial/Non-Developmental Items (C/NDI).
($.400) Obtain Milestone III decision for the Acoustic Firing System.
($.600) Initiate development of Advanced Underwater Limpet Mine equipment to enhance EOD units' ability to detect neutralize and gather intelligence on underwater limpet and special attach mines.
($.150) Initiate development of Advanced Underwater Breathing Apparatus.
($.600) Initiate development of low magnetic Mirco Diver Display that provides sonar input from the Underwater Imaging Systems when in dark turbid, low visibility water environments.
($.250) Initiate the test and evaluation and gain approval for production for a commercial off-the shelf Emergency Evacuation Diver System to assist the forward deployed EOD ARG/CV battle group for transportation of diving casualties.
($.450) Initiate the development and test of a product improvement Advanced Miniature Mine PIP Sensor to the Underwater Imaging System to allow the system to conduct stand-off identification and computer aided detection and classification.
($4.169) Continue to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSW MCM Detachment (USN/USMC). This also includes the development of small, affordable MCM Unmanned Underwater Vehicles.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**JT Service EOD Development/0603654N**	EOD Diving Systems/Q1317	

B. Other Program Funding Summary

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
PANMC 0340			1.400							2.400
OPN '0975	2.195	3.247	5.000						Cont.	Cont.
OPN 5509		1.394	2.176							4.841

C.Acquisition Strategy: Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

D. Schedule Profile: See Attached.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER EOD Diving Systems/Q1317	

0603654N Joint Service EOD Development; Q1317 EOD Diving Systems

RDT&E Milestone Chart

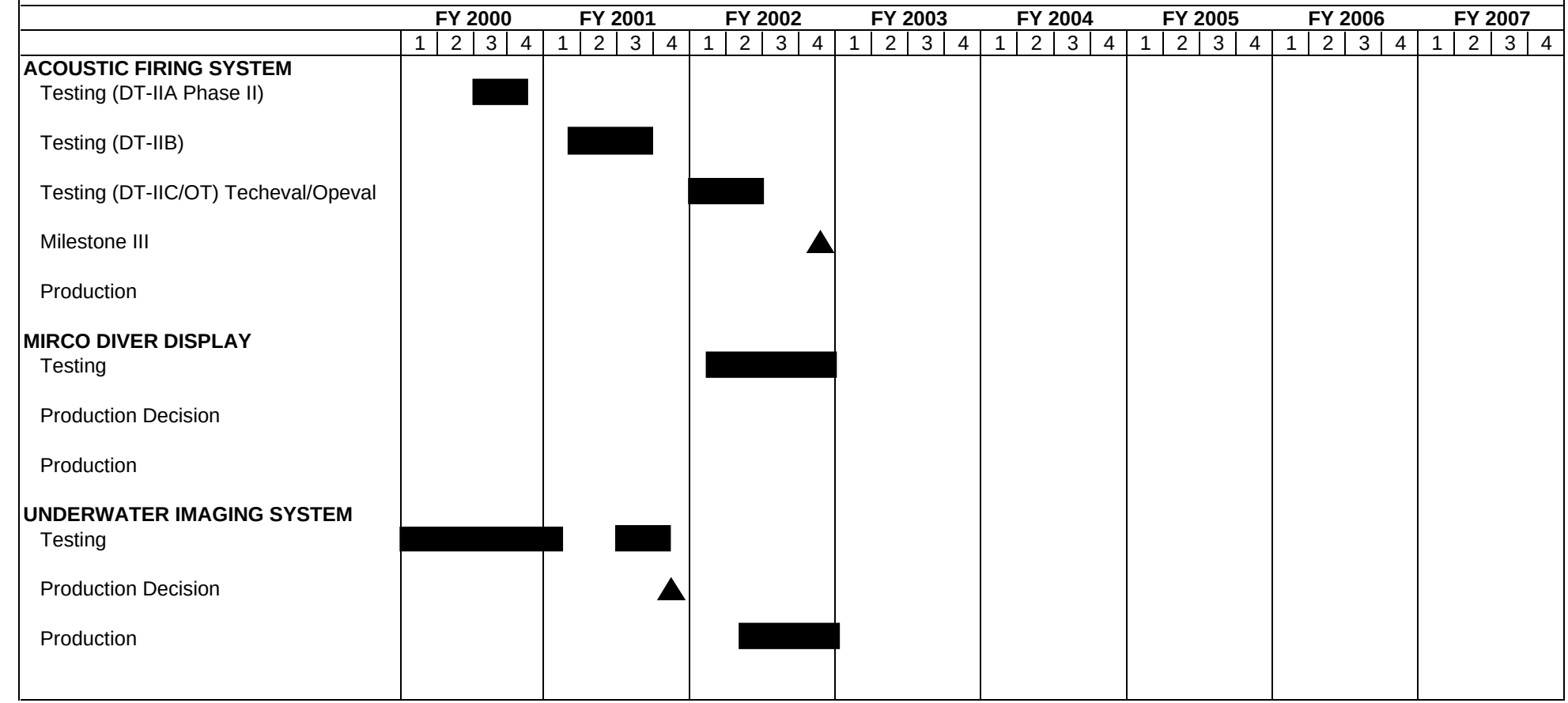

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER EOD Diving Systems/Q1317	

0603654N Joint Service EOD Development; Q1317 EOD Diving Systems

RDT&E Milestone Chart

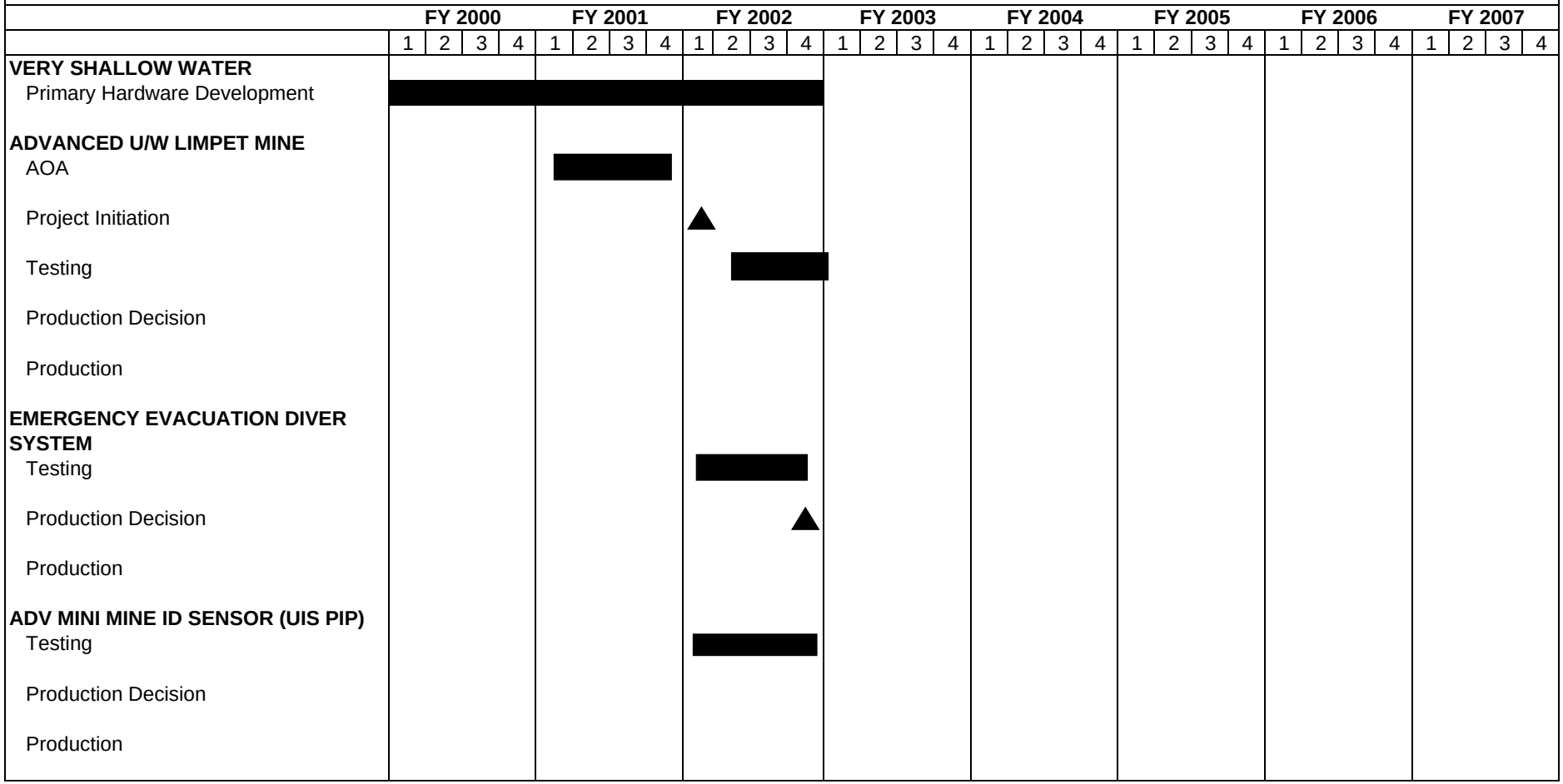

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **JT Service EOD Development 0603654N**	PROJECT NAME AND NUMBER EOD Diving Systems/Q1317	

0603654N Joint Service EOD Development; Q1317 EOD Diving Systems

RDT&E Milestone Chart

	FY 2000				FY 2001				FY 2002				FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ADVANCED UBA																																
Testing																																
Production Decision																																
Production																																

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4** | PROGRAM ELEMENT: **0603654N** | PROJECT NAME AND NUMBER: EOD Diving Systems/Q1317

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	SPAWAR, SD, CA	2.630	1.000	10/99	0.770	10/00	0.200	10/01	Continuing	Continuing	N/A
Primary Hardware Development	WR	Various	15.573	0.857	10/99	2.661	10/00	3.076	10/01	Continuing	Continuing	N/A
Software Development	WR	Various	0.733	0.158	10/99	0.200	10/00	0.200	10/01	Continuing	Continuing	N/A
Systems Engineering	WR	Various	6.400	0.330	10/99	0.300	10/00	0.325	10/01	Continuing	Continuing	N/A
ILS	WR	Various	10.692	0.200	10/99	0.200	10/00	0.225	10/01	Continuing	Continuing	N/A
											0.000	
											0.000	
Subtotal Product Development			36.028	2.545		4.131		4.026		Continuing	Continuing	N/A

Remarks:

Program Management Support	C/CPFF	Dynamic System, Alex, VA	1.846	0.440	01/00	0.450	01/01	0.450	01/02	Continuing	Continuing	N/A
											0.000	N/A
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			1.846	0.440		0.450		0.450		0.000	Continuing	N/A

Remarks:

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **0603654N**			PROJECT NAME AND NUMBER EOD Diving Systems/Q1317						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	Various	1.920	0.400	10/99	0.400	10/00	0.400		Continuing	Continuing	N/A
Operational Test & Evaluation	WR	Various	0.600	0.320	10/99	0.340	10/00	0.300		Continuing	Continuing	N/A
											0.000	
											0.000	
Subtotal T&E			2.520	0.720		0.740		0.700		0.000	Continuing	N/A
Remarks:												
Program Management Personnel	WR	EODTD, IH, MD	3.467	0.650	10/99	0.650	10/00	0.650		Continuing	Continuing	N/A
Miscellaneous	Various	Various	1.070	0.618	02/00	1.042	02/01	1.023		Continuing	Continuing	N/A
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			4.537	1.268		1.692		1.673		Continuing	Continuing	N/A
Remarks:												
Total Cost			44.931	4.973		7.013		6.849		Continuing	Continuing	N/A
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **JUNE 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY - BA 4**					R-1 ITEM NOMENCLATURE **Cooperative Engagement Capability 0603658N**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**182.307**	**177.612**	**74.231**						**Cont.**	**Cont.**
Cooperative Engagement Capability (CEC) K2039	**108.876**	**117.744**	**74.231**						**Cont.**	**Cont.**
Cooperative Engagement Capability (CEC) K2616	**73.431**	**59.868**	**0.000**						**0.000**	**Cont.**
Quantity of RDT&E Articles										**22**

A. (U) Mission Description and Budget Item Justification: Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture capable of fire control quality. CEC distributes sensor data from each ship and aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC will significantly improve our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC will provide critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

(U) CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System modifications. The DDS encodes and distributes ownship sensor and engagement data, is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor which is able to process force levels of data in near real-time. This data is passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA 4**	R-1 ITEM NOMENCLATURE **Cooperative Engagement Capability 0603658N**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 2000 ACCOMPLISHMENTS:
- (U) ($ 62.759) Continued CEC hardware and software engineering efforts and DA efforts at Raytheon Systems Company, St. Petersburg, FL.
- (U) ($ 16.809) Continued CEC TDA engineering efforts at JHU/APL.
- (U) ($ 11.600) Continued CEC E-2C integration efforts at PMA-231.
- (U) ($ 4.600) Continued development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.
- (U) ($ 25.441) Continued field support (In-service Engineering; software support; Integrated Logistics Support Planning).
- (U) ($ 26.824) Continued T&E efforts; conduct engineering, developmental and operational testing.
- (U) ($ 14.358) Continued Navy integration exercises and integration efforts.
- (U) ($ 9.361) Continued Program Management support.
- (U) ($ 10.555) Supported at-sea prototypes, risk reduction, systems engineering, and software development which helped the production Area Air Defense Commander system meet Joint Interoperability requirements.

(U) FY 2001 PLAN:
- (U) ($ 59.249) Continue CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL.
- (U) ($ 14.734) Continue CEC TDA engineering efforts at JHU/APL.
- (U) ($ 13.536) Continue CEC E-2C integration efforts at PMA-231.
- (U) ($ 6.400) Continue development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.
- (U) ($ 15.466) Continue field support (In-service Engineering; software support; Integrated Logistics Support Planning).
- (U) ($ 40.705) Complete AN/USG-2 T&E efforts; conduct engineering, developmental and operational testing.
- (U) ($ 17.256) Continue Navy and integration exercises and integration efforts.
- (U) ($ 6.400) Continue Program Management support.
- (U) ($ 3.866) Portion of extramural program reserved for Small Business Innovator Research assessment in accordance with 15 USC 638.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA 4**	R-1 ITEM NOMENCLATURE **Cooperative Engagement Capability 0603658N**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS: (Cont.)
(U) FY 2002 PLAN:
- (U) ($ 17.000) Continue CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL.
- (U) ($ 11.000) Continue CEC TDA engineering efforts at JHU/APL.
- (U) ($ 32.778) Continue CEC E-2C integration efforts at PMA-231.
- (U) ($ 6.252) Continue field support (In-service Engineering; software support; Integrated Logistics Support Planning).
- (U) ($ 1.979) Continue Navy and integration exercises and integration efforts.
- (U) ($ 5.222) Continue Program Management support.

B. (U) Program Change Summary:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	189.877	119.257	49.135
Appropriated Value:	190.931	179.257	
Adjustments to FY 2000/2001 Appropriated Value/FY 2001 President's Budget :	-8.624	-1.645	25.096
FY 2002 Pres Budget Submit:	182.307	177.612	74.231

Funding: FY 2000 adjustments are due to a Small Business Innovative Research (SBIR) reduction ($-5.181); FY 2000 Midyear execution reduction ($-1.358); an across the board reduction ($-1.054); a Congressional Rescission reduction ($-.744) and a general reduction ($-.287). FY 2001 adjustments are based on a Congressional Rescission reduction ($-1.255) and a Government-Wide Rescission reduction ($-.390). FY 2002 adjustments are based on a CEC E-2C Aircraft Integration increase ($+32.000); miscellaneous changes ($+1.696); and a CEC Reduced Baseline Integration reduction ($-8.600)

Schedule: The CEC/E-2C aircraft FOT&E-1 schedule has been delayed due to non-availability of test aircraft, and modification of E-2C system tracker/CEC system interface requirements. FOT&E-1 was scheduled to start in October 2001 and complete in February 2002. FOT&E-1 has been revised to start in January 2002 and complete in August 2002. The FOT&E-2 schedule, and the planned Initial Operational Cabability (IOC) of a CEC-equipped E-2C squadron in December 2003 remains unchanged.

Technical: Not applicable.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA 4**	R-1 ITEM NOMENCLATURE **Cooperative Engagement Capability 0603658N**

C. (U) Other Program Funding Summary:	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
OP,N (CEC) P-1 Item No. 46	59.416	33.542	77.133						Continuing	1,190.537
SC,N (Various)	48.000	20.500	20.100						Continuing	305.500
AP,N (E-2C) (BA-1/5/6)	38.500	14.900	33.000							143.900
O&M,N (CEC)	19.305	16.293	16.373						Continuing	Continuing

D. (U) ACQUISITION STRATEGY:
The CEC program was approved for Low Rate Initial Production (LRIP-1) in March 1998 and a sole source contract was awarded to Raytheon Systems Company, St. Petersburg, FL.
Follow-on procurement of eleven (11) systems (LRIP-2) was authorized 14 May 1999 and an additional twelve (12) systems (LRIP-3) was authorized 7 April 2000. A fourth LRIP procurement is planned for 3rd quarter of FY 2001, with Full Rate Production (FRP) planned for December 2001 following completion of OPEVAL.

The Navy, Raytheon Systems Company, and Lockheed-Martin Corporation have reached an agreement whereby:
(a) Raytheon will be the design agent for Ship Self Defense System (SSDS) Mark 2, and design agent and implementor of CEC baseline 2.1 supporting SSDS Mark 2.
(b) Lockheed-Martin will be the design agent for CEC baseline 2.2 effort which supports CEC integration into the TBMD program.
(c) The Navy will plan for full and open competition for procurement of CEC equipment and engineering support.

Concurrent contracts were awarded by the Navy on 30 April 1999 in accordance with the agreement, and award fees are structured to ensure cooperation between the contractors. Both contractors participate as members of a "Navy Review Team" of each other's design, and participate in a Navy-led task to define future architecture of CEC in a Battle Force context.

E. (U) SCHEDULE PROFILE: See Next Page.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA 4**	R-1 ITEM NOMENCLATURE **Cooperative Engagement Capability 0603658N**

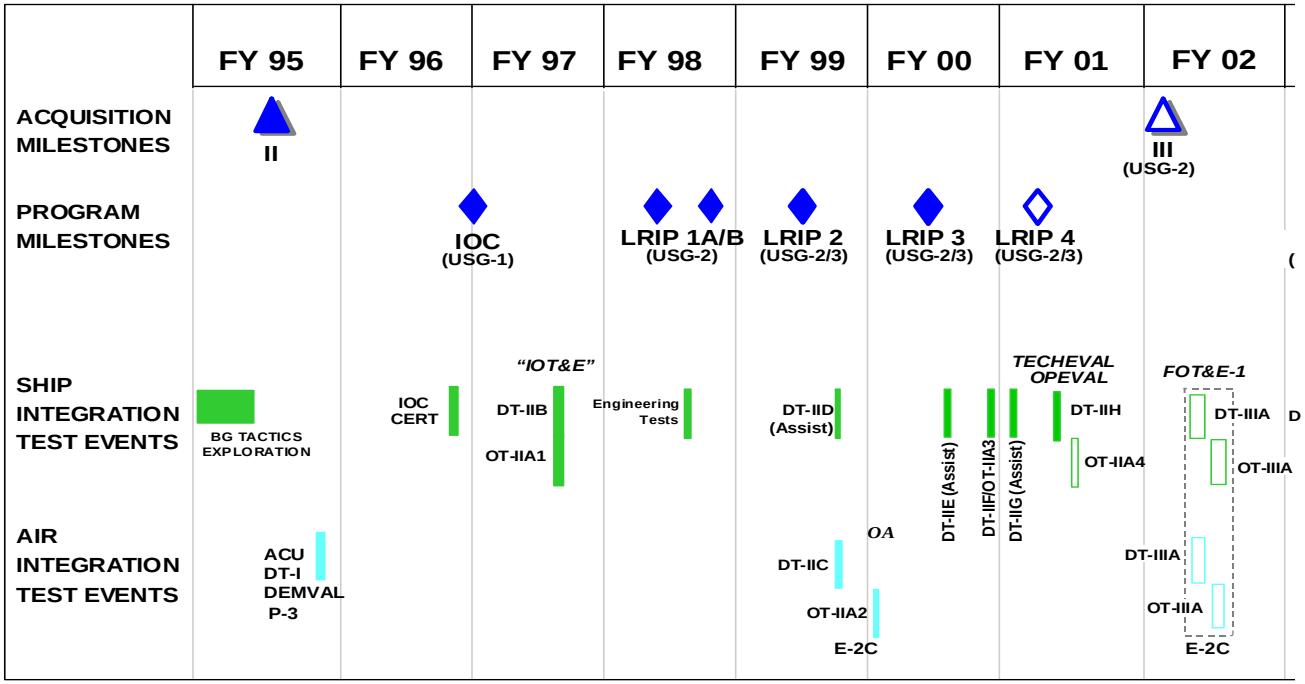

Exhibit R-3 Cost Analysis (page 1) | DATE: **JUNE 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA 4	**CEC - 0603658N**	**CEC - Project K2039**

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
AN/USG-2/3 Development	C/CPAF	Raytheon, St. Peters., FL	487.493	62.759	Oct-99	59.249	Oct-00	17.000	Oct-01	CONT.	CONT.	TBD
AN/USG-2/3 Development/TDA	C/CPFF	JHU/APL, Laurel, MD	199.033	16.809	Nov-99	14.734	Nov-00	11.000	Nov-01	CONT.	CONT.	TBD
E-2C Aircraft Integration	C/CPAF	Northrop Grumman	143.738	11.600	Nov-99	13.536	Oct-00	32.778	Oct-01		201.652	
P-3 Aircraft Integration	C/CPAF	Lockheed-Martin	42.210								42.210	42.210
Baseline 2.2 Software Development	SS/CPAF	Lockheed-Martin	1.250	4.600	Jan-00	6.400	Oct-00				12.250	TBD
Space Based IR Sensors (SBIRS)	C/CPAF	Lockheed-Martin	13.426								13.426	TBD
Modeling & Simulation	PD	PMS-456		5.500	Mar-00						5.500	
In-Service Engineering Activity	WR	NSWC, Port Hueneme	3.048	5.828	Oct-99	3.615	Oct-00	2.000	Oct-01	CONT.	CONT.	
Land Based Test Network	PD	SPAWAR (PMW-159)	1.361								1.361	
Land Based Test Network	PD	NATC, Patuxent River	1.000								1.000	
Software Support Activity	WR	NSWC, Dahlgren, VA	32.515	4.911	Oct-99	9.686	Oct-00	3.000	Oct-01	CONT.	CONT.	
Antenna Redesign	RC	NSWC, Crane, IN		6.646	Jul-00						6.646	
ILS Planning	WR	NSWC, Crane, IN	23.271	12.579	Oct-99	1.420	Oct-00	1.500	Oct-01	CONT.	CONT.	
AEGIS Integration	C/CPAF	Lockheed-Martin	119.968			5.200	Oct-00				125.168	
SSDS/ACDS Integration	C/CPAF	Raytheon (Hughes), CA	33.933	2.298	Feb-00	6.700	Oct-00				42.931	TBD
Area Air Def. Commander (AADC)	C/CPAF	General Dynamics		10.555	Sep-00					0.000	10.555	
Various	Various	Miscellaneous	80.056	2.037	Oct-99	9.966	Oct-00	1.731	Oct-01	CONT.	CONT.	
Subtotal Product Development			1,182.302	146.122		130.506		69.009		CONT.	CONT.	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2) | DATE: JUNE 2001

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA 4	**CEC - 0603658N**	**CEC - Project K2039**

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Land Based Test Network (DEP)	WR	NSWC, Dahlgren, VA	2.200	0.546	Jan-00	0.385	Dec-00				3.131	
Test Support	C/CPAF	Raytheon, St. Peters., FL	1.278	2.460	Oct-99	2.649	Oct-00				6.387	TBD
Test Support	C/CPFF	JHU/APL, Laurel, MD	1.800	2.309	Nov-99	2.553	Nov-00				6.662	TBD
Test Support	WR	NAWC-AD, Pt. Mugu, CA		0.545	Oct-99	0.335	Oct-00				0.880	
Test Support	WR	NRL, Washington, DC		1.902	Oct-99	2.453	Oct-00				4.355	
Test Support	WR	NSWC, Port Hueneme, CA	7.787	4.415	Oct-99	4.902	Oct-00				17.104	
Test Support	PD	PMS-456		1.250	Jan-00	3.345	Oct-00				4.595	
Test Support	PD	SPAWAR (PMW-159)		0.658	Oct-99	0.699	Oct-00				1.357	
Air Operations Test Support	WR	COMNAVAIRLANT	1.700								1.700	
Air Operations Test Support	WR	NATC, Pax River	4.229	0.709	Oct-99	2.119	Oct-00				7.057	
Air Operations Test Support	PD	NAVAIRSYSCOM (PMA-207)		2.891	Oct-99	1.784	Oct-00				4.675	
Aircraft Test Support	PD	NAVAIRSYSCOM (PMA-231)		0.280	Oct-99	1.115	Oct-00				1.395	
Test Requirements	WR	AFWTF, Puerto Rico		0.812	Oct-99	2.565	Oct-00				3.377	
Test Requirements	WR	COMOPTEVFOR		0.506	Oct-99	1.316	Oct-00				1.822	
Test Data Reduction	WR	NWAS, Corona	6.500	3.089	Oct-99	3.093	Oct-00				12.682	
ECM Test Support (BIG CROW)	MIPR	Kirkland AFB, NM		1.000	Jan-00	1.951	Oct-00				2.951	
Test Support	WR	NSWC, Crane		0.402	Jan-00	0.167	Oct-00				0.569	
Test Support	PD	PMS-400		0.575	Jan-00	2.100	Oct-00				2.675	
Various	Various	Miscellaneous	42.156	2.475	Oct-99	7.174	Oct-00			CONT.	CONT.	
Subtotal T&E			67.650	26.824		40.705		0.000		CONT.	CONT.	
Remarks:												
Program Management Support	C/CPFF	Technautics, Alexandria, VA	8.400	2.691	Oct-98	2.622	Nov-00	2.779	Oct-01		16.492	
Various	Various	Miscellaneous	34.087	6.670	Oct-98	3.778	Oct-00	2.443	Oct-01	CONT.	CONT.	
Subtotal Management			42.487	9.361		6.400		5.222		CONT.	CONT.	
Remarks:												
Total Cost			1,292.439	182.307		177.612		74.231		CONT.	CONT.	
Remarks:												

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Ocean Engineering Development 0603713N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**15.058**	**15.230**	**16.077**						**CONT.**	**CONT.**
Deep Submergence Biomedical Development/S0099	**3.547**	**3.634**	**3.723**						**CONT.**	**CONT.**
Shallow Depth Diving Equipment/S0394	**11.511**	**11.596**	**12.354**						**CONT.**	**CONT.**
Quantity of RDT&E Articles									**CONT.**	**CONT.**

A. Mission Description and Budget Item Justification: Developments in this program will enable the U.S. Navy to overcome deficiencies that constrain underwater operations in the areas of search, location, rescue, recovery, salvage, construction, and protection of offshore assets. This program develops medical technology, diver life support equipment, and the vehicles, systems, and tools to permit manned underwater operations.

B. Program Change Summary:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	16.813	15.371	16.052
Appropriated Value:			
Adjustment to: FY 2000/2001 Appropriated Value/	-1.755	-0.141	0.025
FY 2001 President's Budget:			
FY 2002 PRES Budget Submit:	15.058	15.230	16.077

Funding: The FY 00 decrease of $-1.755M results from various adjustments. The FY 01 decrease of $0.141M results from .7% Pro-Rata Reduction decrease ($108K)and Government-Wide Rescission decrease ($33K). The FY 02 increase of $0.025M results from various adjustments.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Ocean Engineering Development 0603713N

B. Program Change Summary (Cont.):

Schedule: Not applicable.

Technical: Not applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Ocean Engineering Development 0603713N**				PROJECT NAME AND NUMBER Deep Submergence Biomedical Development/S0099					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**3.547**	**3.634**	**3.723**						**CONT.**	**CONT.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: Develops advanced biomedical/bioengineering technology for enhancing medical and life support for submarine escape and rescue; and for diver safety and effectiveness; supports deeper, longer, safer, more flexible dives. Deliverables include: a) exposure guidance for DISSUB atmospheric contaminants, underwater continuous and impulsive noise, underwater blast, oxygen breathing, and diving depth/time profiles; b) medical procedures for life support on DISSUB, submarine escape and rescue (including new Submarine Rescue Diving and Recompression System, SRDRS), prevention and treatment of decompression illness, c) technologies to assess underwater noise and DISSUB life support parameters; enable non-chemical CO2 scrubbing; predict decompression risk in diving; provide DISSUB senior survivor with expert decision system, and enhance underwater swimming efficiency.

Program Accomplishments and Plans:

FY 2000 Accomplishments:

- ($1.780) Diver Health and Safety Research: Develop new underwater thermal protection garments. Develop guidance for acceptable underwater breathing apparatus respiratory loads present in combination. Produce diving at altitude decompression tables. Deliver validated scaling procedures from animals to humans for decompression. Conduct manned test of one-atmosphere treatments for decompression sickness with divers. Determine damage risk thresholds for underwater blast/impulse noise. Develop protective materials and procedures against underwater sound threats to divers.

- ($1.767) Submarine Rescue: Deliver SEAREX and Guard Book package for SSBN 726 class. Issue DISSUB atmosphere contaminant exposure guidance. Deliver new markers for re-entry into fire-contaminated spaces. Publish revised Pressurized Submarine Rescue Manual. Develop guidance for decompression in SRDRS. Provide alternative to electrically-powered or passive CO2 scrubbing.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Ocean Engineering Development 0603713N**	Deep Submergence Biomedical Development/S0099

FY 2001 Plan:

- ($ 1.833) Diver Health and Safety Research: Final integration of USN decompression tables across gases, pressures, mixes, and repetitions. Updated performance standards for non-UBA diving gear. Assess efficacy of prototype underwater swimmer protection strategies. Deliver guidance for acceptable UBA respiratory loads in combination. Continue development of new diver thermal protective garments with industry, and begin prototype evaluations. Issue recommendations to manufacturers for procedures to reduce drag underwater.

- ($1.801) Submarine Rescue: Determine allowable surface intervals for escapers and rescuees from pressurized DISSUB. Determine actual escape times from SSN 688 and SSBN 726 classes. Provide SEAREX package for SEAWOLF class. Develop SEAREX decision aid for New Attack Submarine (NSSN). Develop SRDRS biomedical acceptance criteria.

FY 2002 Plan:

- ($2.123) Diver Health and Safety Research: Pulmonary oxygen toxicity risk algorithm. Procedures for assessing and mitigating risk for diving in contaminated water. Procedure to determine remaining CO2 scrubber duration. Methods to reduce respiratory impedance in underwater breathing apparatus. Interim guidance for blast exposure for divers. Development of advanced insulation garments for diver thermal protection. Agents to prevent CNS oxygen toxicity.

- ($1.600) Submarine Rescue: Decompression procedures for pressurized SRDRS operators. Emergency procedure for monitoring atmospheric contaminants in submarines. Novel methods to accelerate decompression in submarine rescue. Adjunctive therapies for treating DISSUB survivors at one ATA. Improved guidance for survival of submarine crews awaiting rescue. Optimized decompression schedules for submarine rescue.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Ocean Engineering Development 0603713N**	Deep Submergence Biomedical Development/S0099	

B. Other Program Funding Summary: Not applicable.

Related RDT&E: Not Applicable.

C. Acquisition Strategy: Integrated thrust area teams (e.g. decompression research) are established with university, commercial and in-house Navy lab to jointly execute biomedical R&D; peer review of research proposals accomplished by independent Technical Advisory Board; annual review of progress by Executive Review Board (CNO/NAVSEA/ONR/BUMED); program management by 0-6 Medical Dept Officer; contracting by competitive process using BAA and leveraging ONR capabilities.

D. Schedule Profile: Not applicable

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4**

PROGRAM ELEMENT: **Ocean Engineering Development 0603713N**

PROJECT NAME AND NUMBER: Deep Submergence Biomedical Developmental/S0099

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Not Applicable.

Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Not Applicable.

Exhibit R-3 Cost Analysis (page 2)											DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA - 4**			PROGRAM ELEMENT **Ocean Engineering Development 0603713N**			PROJECT NAME AND NUMBER Deep Submergence Biomedical Development/S0099							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NEDU	7.717	3.547		3.634		3.723		CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			7.717	3.547		3.634		3.723		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Total Cost			7.717*	3.547		3.634		3.723		CONT.	CONT.	
Remarks: * Prior to FY98, funds were in Project M0099.												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Ocean Engineering Development 0603713N**				PROJECT NAME AND NUMBER Shallow Depth Diving Equipment/S0394					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**11.511**	**11.596**	**12.354**						**CONT.**	**CONT.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: This project is to develop systems to support submarine escape and rescue missions, and conventional diver operations. Diver operations include ship husbandry, salvage/recovery, and submarine rescue operations to support national, as well as, Navy needs around the world. Modern certifiable diving systems that ensure diver safety and allow maximum work efficiency will replace currently antiquated systems. Efforts are currently focused on the Submarine Rescue Diving and Recompression System (SRDRS) to provide a new rapidly deployed emergency submarine rescue capability. SRDRS will fill the gap created by the decommissioning of USS PIGEON (ASR 21) and USS ORTOLAN (ASR 22) and provide a new capability of pressurized transportation of rescuees from a stricken submarine directly to the decompression system eliminating the requirement for Deep Submergence Rescue Vehicles, Mother Submarines and Submarine Rescue Chambers. SRDRS is to include an air transportable rapid assessment/underwater work system, a decompression chamber system and a pressurized rescue module. The SRDRS will provide a global rapid response capability to support submarine rescue missions with an increase in capability at a fraction of the cost of the currently available systems.

Program Accomplishments and Plans:

FY 2000 Accomplishments:

- ($11.511) Submarine Rescue Diving and Recompression System: Complete acceptance testing of the prototype Assessment/Underwater Work System. Continue fabrication and acceptance testing of the prototype Submarine Decompression System and support equipment. Complete contract award for detailed design and fabrication of prototype Pressurized Rescue Module.

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	**Ocean Engineering Development 0603713N**	Shallow Depth Diving Equipment/S0394	

FY 2001 Plan:

- ($11.295) Submarine Rescue Diving and Recompression System: Complete fabrication and acceptance testing of the prototype Submarine Decompression System and support equipment. Continue design and fabrication of prototype Pressurized Rescue Module and support equipment.

- ($.301) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2002 Plan:

- ($12.354) Submarine Rescue Diving and Recompression System: Continue design and fabrication of prototype Pressurized Rescue Module and support equipment.

B. Other Program Funding Summary: Not applicable.

Related RDT&E: Not Applicable.

C. Acquisition Strategy: The Atmospheric Diving Suit (ADS) Segment of the SRDRS is a Non-Developmental Item (NDI) which is procured via a sole source contract. The Submarine Rescue System (SRS) segment of the SRDRS is largely based on the use of Commercial-Off-the-Shelf (COTS) technology and maximum use of Non-Developmental Items (NDI). The SRS segment is being procured using performance based specifications. The SRS contracts will be awarded competitively and will be based on technical capability and cost considerations (best value). Program Management of SRDRS is accomplished through the use of SEA 00C leadership of an Integrated Product Team (IPT). The Prototype system will provide full operational capability and no additional procurement is planned. The system is designed to be Government Owned/Commercially Operated (GO/CO).

Exhibit R-3 Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Ocean Engineering Development 0603713N**	Shallow Depth Diving Equipment/S0394

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC - CSS	18.219	1.870	12/99						20.089	20.089
	CPAF	Oceaneering	9.078								9.078	9.078
	RC	NAVFACCO	3.240								3.240	3.240
	CPAF	GPC	1.755	2.725	10/99	1.700	12/00				6.180	6.180
	CPIF	Hard Suits Inc.		0.688	09/00	3.322	01/01				4.010	20.244
	Various	Miscellaneous	2.067	0.071		0.296		7.004		CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering	CPAF	Oceaneering	2.892	3.093	12/99	3.638	12/00				9.623	9.623
	Various	Miscellaneous						3.000		CONT.	CONT.	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees	CPAF	Oceaneering	0.829	0.247	12/99	0.291	12/00				1.367	
	CPAF	GPC	0.067	0.120	10/99	0.051	12/00				0.238	
											0.000	
Subtotal Product Development			38.147	8.814		9.298		10.004		CONT.	CONT.	

Remarks: Award Fees are 6%.

Development Support Equipment											0.000	
Software Development	WR	NSWC CD		0.221	11/99						0.221	0.221
Training Development											0.000	
Integrated Logistics Support	MIPR	DOI		0.809	01/00	0.905	01/01				1.714	1.714
	Various	Miscellaneous						0.850			0.850	0.850
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	1.030		0.905		0.850		CONT.	CONT.	

Remarks:

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA - 4** | PROGRAM ELEMENT: **Ocean Engineering Development 0603713N** | PROJECT NAME AND NUMBER: Shallow Depth Diving Equipment/S0394

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	Miscellaneous	0.641	0.274		0.300		0.300		CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.641	0.274		0.300		0.300		CONT.	CONT.	
Remarks:												
Contractor Engineering Support	Various	Miscellaneous	0.717	0.276		0.250		0.250		CONT.	CONT.	
Government Engineering Support	WR	NFESC	0.267	0.049	03/00						0.316	0.316
	MIPR	DOI		0.638	01/00	0.523	01/01				1.161	1.161
	Various	Miscellaneous		0.210		0.100		0.750		CONT.	CONT.	
Program Management Support	Various	Miscellaneous		0.115		0.120		0.100		CONT.	CONT.	
Travel			0.130	0.105		0.100		0.100		CONT.	CONT.	
Labor (Research Personnel)			0.453							CONT.	CONT.	
Overhead												
Subtotal Management			1.567	1.393		1.093		1.200		CONT.	CONT.	
Remarks:												
Total Cost			40.355	11.511		11.596		12.354		CONT.	CONT.	
Remarks:												

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, BA4**					R-1 ITEM NOMENCLATURE Environmental Protection / PE0603721N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**79.565**	**65.506**	**46.117**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
Shipboard Waste Mgmt / S0401	**52.764**	**48.038**	**31.840**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
Env Compliance / W2210	**4.180**	**4.768**	**4.612**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
Aviation Depot Maint Tech / W2623*	**1.951**	**1.982**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.0**	**5.869**
Pollution Abatement / Y0817	**8.783**	**8.736**	**9.665**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
Asbestos Removal / Y2402*	**3.962**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.0**	**9.704**
Resource Recovery Tech Center / Y2403*	**7.925**	**1.982**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.0**	**20.428**
	0.000	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.0**	**7.927**

A. (U) Mission Description and Budget Item Justification: This program develops processes, prototype hardware, systems, and operational procedures that will allow the Navy to operate in U.S., foreign, and international waters, air, space, and land areas while complying with U.S. statutes and international agreements. The program also includes efforts to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's compliance with: OPNAVINST 5090.1B CH-2 of 9 September 1999 and other Navy environmental-related policies; the Clean Water Act, Clean Air Act, Act to Prevent Pollution from Ships, National Environmental Policy Act, Marine Plastic Pollution Research and Control Act, Endangered Species Act, Marine Mammal Protection Act, Resource Conservation and Recovery Act, Toxic Substances Control Act, U.S. Public Vessel Medical Waste Anti-Dumping Act, and Federal Facility Compliance Act; and Executive Orders 12088, 12114, 12843, 13089, 13101, 13112, and 13158. Project S0401 supports RDT&E efforts that allow Navy ships and submarines to comply with existing and emerging laws, regulations, and policies in four major areas: ozone depleting substances, liquid wastes, solid wastes, and hazardous and other wastes. Project W2210 and Project Y0817 support and validate development of technologies to enable Navy facilities to comply with environmental laws, regulations, and policies in a cost-effective manner.

* Projects W2623, Y2402, Y2403 and Y2837 are Congressional adds.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, BA4**	R-1 ITEM NOMENCLATURE Environmental Protection / PE 0603721

B. (U) Program Change Summary:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:	82.999	62.194	45.181
Appropriated Value:	82.793	62.194	
Adjustments to FY 2000/2001 Appropriated Value			
FY 2001 President's Budget:	-3.228	3.312	0.936
FY 2002 PRES Budget Submit:	79.565	65.506	46.117

(U) Funding:

FY 2000 Decrease of $3.228M reflects SBIR transfer of -$0.634M; midyear adjustments of -$1.479M; BTRs of -$.747M; other adjustments -$2.037M; Congressional Rescission -$0.331M; and Congressional add of $2.000M for aviation depot maintenance.

FY 2001 Increase of $11.312M reflects Congressional add of $2.000M for aviation depot maintenance; Congressional add of $2.000M for resource preservation initiative and Congressional add of $2.0M for Resource Preservation Initiative; and other adjustments of -$0.615M.

FY 2002 Increase of $.935M reflects Environmental Quality Baseline Adjustments of +$1.418M.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Environmental Protection / PE0603721N**				PROJECT NAME AND NUMBER Shipboard Waste Management / S0401					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Shipboard Waste Management / S0401	**52.764**	**48.111**	**31.840**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
RDT&E Articles Qty										
Oily Waste Polishing System - Engineering Development Models	**1-$1M**	**1-$0.4M**								
Non-Oily Waste Polishing System - Engineering Development Models	**1-$1M**	**1-$1M**		**0.000**		**0.000**				
Non-CFC Refrigerant Replacement Kits - Engineering Development Models										
Liquid Waste Thermal Destruction - Engineering Development Models	**2-$3M**		**1-$2M**		**0.000**			**0.000**		
Shipboard Pollution Prevention - Test Articles						**0.000**		**0.000**		
Solid Waste - Engineering Development Models	**1-$2M**	**1-$2M**								
Underwater Hull Cleaning - Engineering Development Models		**1-$0.7M**		**0**						

A. (U) Mission Description and Budget Item Justification

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($12.548M) Ozone Depleting Substances - Completed development of backfit modification kits for surface ship 125-ton & 150-ton CFC-114 air-conditioning plant designs. Completed development of backfit modification kits for surface ship 300-ton and 363-ton CFC-114 air-conditioning plant designs. Completed one-year at-sea ship test and evaluation of HFC-236fa backfit modifications in 200-ton CFC-114 air-conditioning plants. Continued development and qualification of backfit modifications for remaining surface ship 250-ton CFC-114 air-conditioning plant designs. Continued development of shipboard alternative (non-vapor-compression) cooling concepts. Continued evaluation of non-ODS fire protection concepts and systems for future surface combatants.

(U) ($24.016M) Integrated Liquid Wastes - Continued support of rulemaking process with Environmental Protection Agency (EPA) in development of Uniform National Discharge Standards (UNDS) for liquid waste discharges from Navy vessels: continued Phase II, setting of Marine Pollution Control Device (MPCD) performance standards. Continued development of integrated liquid waste treatment system: continued development of 10 gal/min Oily Waste Polishing System (OWPS) OWS-10 Polisher, continued development of 50-gal/min OWPS OWS-50 Polisher, and initiated development of 5-gal/min combined OWPS OWS-5 Polisher for new-construction ships; continued development of Engineering Development Model (EDM) non-oily wastewater treatment systems; continued development of advanced Oil Content Monitor (OCM); completed test and evaluation of upgraded shipboard vortex sewage incinerator; and initiated development of advanced thermal destruction system for concentrated ship liquid wastes. Continued development of design fixes for compensated fuel ballast systems.

(U) ($7.200M) Solid Wastes - Continued development of management processes and systems for plastics for submarine application: converted SSN-688 Class submarine Temporary Alteration (TEMPALT) to a Ship Alteration (SHIPALT) and upgraded test submarines; performed TEMPALTs of prototype equipment aboard two SSBN-726 Class submarines and conducted at-sea test and evaluation; completed investigation of onboard storage techniques and locations for SSN-21 Class submarines; and initiated investigation of onboard storage techniques and locations for SSN-774 Class submarines. Initiated development of advanced thermal destruction system for processing shipboard solid wastes.

(U) ($9.000M) Hazardous and Other Major Ship Wastes - Continued shipboard hazardous materials substitution and elimination process and continued test and evaluation of pollution prevention equipment aboard ship. Continued quality assurance testing on reformulated commercial paints. Continued development of oil spill response capabilities: completed development of oil and skimmer tracking system; continued development of Recovered Oil Logistics System; and initiated oil spill risk assessment program for major Navy ports. Continued development of marine mammals ship database tracking system. Initiated development and testing of new low-copper underwater hull antifouling coatings. Initiated development of underwater hull cleaning system.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Shipboard Waste Management / S0401

2. (U) FY 2001 PLAN:

(U) ($6.000M) Ozone Depleting Substances - Complete development and qualification of backfit modifications for remaining surface ship 250-ton CFC-114 air-conditioning plant designs. Continue development of shipboard alternative (non-vapor-compression) cooling concepts. Continue evaluation of non-ODS fire protection concepts and systems for future surface combatants.

(U) ($26.781M) Integrated Liquid Wastes - Continue support of rulemaking process with EPA in development of UNDS for liquid waste discharges from Navy vessels: continue Phase II, setting of MPCD performance standards. Continue development of integrated liquid waste treatment system: continue development of OWS-10 Polisher, continue development of OWS-50 Polisher, and continue developm OWS-5 Polisher; continue development of advanced OCM; continue development of EDM non-oily wastewater treatment system; and continue develoment of advanced thermal destruction system for concentrated ship liquid wastes. Continue development of design fixes for compensated fuel ballast systems.

(U) ($5.400M) Solid Wastes - Continue development of management processes and systems for plastics for submarine application: convert SSBN-726 Class submarine TEMPALT to SHIPALT and upgrade test submarines; perform TEMPALT of prototype equipment aboard two SSN-21 Class submarines and conduct at-sea test and evaluation; and continue investigation of onboard storage techniques and locations for SSN-774 Class submarines. Continue development of advanced thermal destruction system for processing shipboard solid wastes.

(U) ($9.400M) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous materials substitution and elimination process and continue test and evaluation of pollution-prevention equipment aboard ship. Continue quality assurance testing on reformulated commercial paints. Continue development of oil spill response capabilities: continue development of Recovered Oil Logistics System; continue oil spill risk assessment program for major Navy ports; initiate development of portable oil incinerator system; and initiate development of oil spill program Geographical Information System (GIS). Continue development of marine mammals ship database tracking system: initiate demonstration. Continue development and testing of new low-copper underwater hull antifouling coatings. Continue development of underwater hull cleaning system.

(U) ($0.530M) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

(U) ($3.100M) Ozone Depleting Substances - Complete Integrated Logistics Support (ILS) documentation for CFC-114 air-conditioning plant designs. Continue development of shipboard alternative (non-vapor compression) cooling concepts. Continue evaluation of non-ODS fire protection concepts and systems for future surface combatants.

(U) ($12.140M) Integrated Liquid Wastes - Continue support of rulemaking process with EPA in development of UNDS for liquid waste discharges from Navy vessels: continue Phase II, setting of MPCD performance standards. Continue development of integrated liquid waste treatment system: complete development of OWS-10 Polisher and continue ILS documentation, complete development of OWS-50 Polisher and continue ILS documentation, and complete development of OWS-5 Polisher; complete development of advanced OCM; continue development of EDM non-oily wastewater treatment systems; and continue develoment of advanced thermal destruction system for concentrated ship liquid wastes. Continue development of design fixes for compensated fuel ballast systems.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Shipboard Waste Management / S0401

(U) ($8.000M) Solid Wastes - Complete development of management processes and systems for plastics for submarine application: convert SSN-21 Class submarine TEMPALT to SHIPALT and upgrade test submarines; and complete investigation of onboard storage techniques and locations for SSN-774 Class submarines. Continue development of advanced thermal destruction system for processing shipboard solid wastes.

(U) ($8.600M) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous materials substitution and elimination process and continue test and evaluation of pollution-prevention equipment aboard ship. Continued quality assurance testing on reformulated commercial paints. Continue development of oil spill response capabilities: complete oil spill risk assessment program for major Navy ports; continue development of Recovered Oil Logistics System; continue development of portable oil incinerator system; continue development of oil spill program GIS; initiate development of oil and skimmer efficiency improvements; and initiate development of wildlife mitigation techniques. Continue development of marine mammals ship database tracking system: continue demonstration. Continue development and testing of new low-copper underwater hull antifouling coatings. Continue development of underwater hull cleaning system.

B. (U) Other Program Funding Summary: Demonstrated and validated technologies are transitioned to various SCN, OPN, and O&MN budget accounts for implementation as part of a Fleet modernization program or new ship construction.

(U) Related RDT&E: (U) Defense Research Sciences/Shipboard Processes (PE 61153N/R3162)
(U) Readiness, Training, and Environmental Quality/Logistics and Environmental Quality (PE 62233N)
(U) Environmental Quality and Logistics Advanced Technology/Environmental Requirements Advanced Technology (PE 63712N/R2206)

C. (U) Acquisition Strategy: (U) RDT&E Contracts are Competitive Procurements.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Environmental Protection / PE0603721N**	PROJECT NAME AND NUMBER Shipboard Waste Management / S0401

D. (U) Schedule Profile:

FY00

Ozone Depleting Substance
Complete Development 125-Ton & 150-Ton CFC-114 A/C Modification Kits
Complete Development 300-Ton & 363-Ton CFC-114 A/C Modification Kits
Complete Ship Test 200-Ton CFC-114 A/C Modification

Integrated Liquid Wastes
Initiate Development Future OWS-5 Polisher
Complete Upgraded Sewage Incinerator Test & Evaluation
Initiate Development Advanced Thermal Destruction System (Liquid Wastes)

Shipboard Solid Wastes
Convert SSN-688 Class TEMPALT to SHIPALT and Upgrade Test Submarines
Perform SSBN-726 Class Plastics Waste TEMPALT and Initiate Test & Evaluation
Initiate SSN-774 Class Plastics Waste Storage Investigations
Initiate Development Advanced Thermal Destruction System (Solid Wastes)

Hazardous & Other Major Ship Wastes
Complete Oil and Skimmer Tracking System
Initiate Oil Spill Risk Assessment Program for Navy Ports
Initiate Development New Underwater Hull Coatings
Initiate Development Underwater Hull Cleaning System

FY01

Ozone Depleting Substance
Complete Development Remaining 250-Ton A/C Modification Kits

Integrated Liquid Wastes

Shipboard Solid Wastes
Convert SSBN-726 Class TEMPALT to SHIPALT and Upgrade Test Submarines
Perform SSN-21 Class Plastics Waste TEMPALT and Initiate Test & Evaluation

Hazardous & Other Major Ship Wastes
Initiate Portable Oil Incinerator
Initiate Oil Spill Geographical Information System
Initiate Marine Mammals Tracking Database Demonstration

FY02

Ozone Depleting Substance
Complete ILS Documentation CFC-114 A/C Plant Designs

Integrated Liquid Wastes
Complete Development OWS-10 Polisher
Complete Development OWS-50 Polisher
Complete Development OWS-5 Polisher
Complete Development Advanced OCM

Shipboard Solid Wastes
Convert SSN-21 Class TEMPALT to SHIPALT and Upgrade Test Submarines
Complete SSN-774 Class Plastics Waste Storage Investigations

Hazardous & Other Major Ship Wastes
Complete Oil Spill Risk Assessment Program for Navy Ports
Initiate Oil and Skimmer Efficiency Improvements
Initiate Wildlife Mitigation Techniques

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**			PROGRAM ELEMENT **Environmental Protection / PE0603721N**			PROJECT NAME AND NUMBER Shipboard Waste Management / S0401						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPFF	Westinghouse Machinery Tech Div, Pitts, PA	14.580	0.000	N/A	0.000	N/A	0.000	N/A	N/A	14.580	14.580
Primary Hardware Development	C/CPFF	Geo-Centers, Inc., Boston, MA	13.750	4.000	12/99	6.500	12/00	3.000	12/01	Cont	Cont	N/A
Primary Hardware Development	SS/CPFF	York International Corp York, PA	2.700	0.000	N/A	0.000	N/A	0.000	N/A	N/A	2.700	2.700
Primary Hardware Development	SS/CPFF	York International Corp York, PA	8.350	3.000	02/00	2.500	02/01	1.000	01/02	10.150	Cont	Cont
Primary Hardware Development	SS/CPFF	Northern Research & Engineering Corp, Waburn, MA	1.200	0.000	N/A	0.000	N/A	0.000	N/A	N/A	1.200	1.200
Primary Hardware Development	C/CPFF	M. Rosenblatt & Son New York, NY	9.363	0.830	01/00	1.000	01/01	0.500	01/02	Cont	Cont	N/A
Ancillary Hardware Development	Various	Misc. Contracts	15.110	5.000	N/A	1.274	N/A		N/A	N/A	N/A	N/A
Systems Engineering	C/CPFF	John J. McMullen &	3.587	0.600	12/99	0.600	12/00	0.300	12/01	Cont	Cont	N/A
Subtotal Product Development			68.640	13.430		11.874		4.800		Cont	Cont	N/A
Remarks: (1) Hardware Development and Systems Engineering Tasks use CPFF Delivery Order Contracts for Continuing Development of Pollution Abatement Hardware and Ship Systems Engineering Analysis												
Software Development	Various	Misc. Contracts	0.070	0.000		0.000				0.000	Cont	N/A
Training Development											Cont	
Integrated Logistics Support											Cont	
Configuration Management											Cont	
Technical Data											Cont	
GFE											Cont	
Subtotal Support			0.070	0.000		0.000		0.000		0.000	Cont	
Remarks: Not Applicable.												

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Environmental Protection / PE0603721N**			PROJECT NAME AND NUMBER Shipboard Waste Management / S0401						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Carderock Div, Bethesda, MD	86.324	20.779	N/A	22.400	N/A	18.000	N/A	Cont	Cont	N/A
Developmental Test & Evaluation	WR	Naval Research Lab Wash, DC	19.082	4.154	N/A	3.000	N/A	3.000	N/A	Cont	Cont	N/A
Developmental Test & Evaluation	WR	SPAWARSYSCEN San Diego, CA	3.310	1.686	N/A	1.500	N/A	1.500	N/A	Cont	Cont	N/A
Process Control Engineering	C/CPFF	GSA/BAH Arlington, Va	0.000	3.000	12/99	3.020	N/A	2.754	12/01	Cont	Cont	N/A
Developmental Test & Evaluation	WR	Misc. Govt Labs	21.332	0.680	N/A	0.700	N/A	0.200	N/A	Cont	Cont	N/A
Developmental Test & Evaluation	C/CPFF	Geo-Centers, Inc. Boston, MA	9.151	4.000	12/99	1.500	12/00	1.500	12/01	Cont	Cont	N/A
Developmental Test & Evaluation	C/CPFF	York International Corp, York , PA	12.000	0.000	N/A	0.000	N/A	0.000	N/A	0.000	12.000	12.000
Developmental Test & Evaluation	C/CPFF	Misc. Contracts	7.440	4.985	Var	4.067	Var	0.036	Var	Cont	Cont	N/A
Subtotal T&E			158.639	39.284		36.187		26.990		0.000	Cont	N/A
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel				0.050		0.050		0.050			Cont	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.050		0.050		0.050		0.000	Cont	
Remarks: Not applicable.												
Total Cost			227.349	52.764		48.111		31.840		Cont	Cont	Cont
Remarks:												

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Environmental Protection / PE0603721N**				PROJECT NAME AND NUMBER Environmental Compliance / W2210					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Environmental Compliance / W2210	**4.180**	**4.768**	**4.612**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: This project supports development and implementation of technologies which will lead to environmentally safe naval aviation operations and support; compliance with international, federal, state, and local regulations and policies; reduction of increasing compliance costs and personal liability; and enhancement of naval aviation mission effectiveness. Naval aviation pollution prevention efforts were previously supported by Project Y0817, Pollution Abatement Ashore. This project will support that part of project Y0817 that addressed aviation pollution prevention technologies as well as additional operational and shipboard aviation requirements previously unsupported. Specific regulatory requirements include Executive Orders 12856 (Pollution Prevention) and 12873 (Recycling & Waste Prevention), the Clean Air Act (CAA) and associated National Emission Standards for Hazardous Air Pollutants (NESHAPs) and National Ambient Air Quality Standards (NAAQS), the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), as well as Occupational, Safety and Health Administration (OSHA) standards.

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($2.308M) Continued to research, develop, and test alternatives to aircraft finishing, repair and maintenance processes that use toxic heavy metals, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). Continued to formulate and certify newly developed aircraft coatings. Continued technology research development, demonstrations/validations of alternatives to chromium and cadmium electroplating processes. Continued to develop and validate source reduction in aircraft wash. Continued to develop and demonstrate alternative propulsion system technologies that minimize the use and generation of hazardous materials in manufacturing and repair processes. Completed development and demonstration of the following technologies: waterborne topcoats, electrocoat/powdercoat, flashjet, non-HAPs paint purge solvents, non-HAPs chemical strippers, zinc/nickel plating as a cadmium replacement, tin-zinc plating as a cadmium replacement, CO2 retrofit of portable chlorofluorocarbon (CFC) fire extinguishers, reduction of halon 1301 release during maintenance and glass bead media recycling. Continued development of non-chromated paint primers, non-HAP sealants, mobile paint stripping technology, non-HAPs pre-paint cleaner.

(U) ($0.290M) Continued to provide scientific and technical expertise for continued aviation pollution prevention technology development, demonstration, and validation.

(U) ($0.535M) Continued to develop and demonstrate low VOCs, non-chromated adhesive bonding primers, and aluminum-manganese electroplating as a cadmium replacement.

(U) ($0.440M) Continued to develop and demonstrate conversion coatings alternatives.

(U) ($0.280M) Initiated development and demonstration of alternative ordnance materials and processes.

(U) ($0.327M) Initiated development and demonstration of environmentally compatible Aircraft Launch and Recovery Equipment (ALRE) lubricants and certify processes that reduce their emission to the sea.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Environmental Compliance / W2210

2. (U) FY 2001 PLAN:

(U) ($2.798M) Continue to research, develop, and test alternatives to aircraft manufacturing, finishing, repair and maintenance processes that use toxic heavy metals, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). Continue to formulate and certify newly developed aircraft coatings. Continue technology research development, demonstrations/validations of alternatives to chromium and cadmium electroplating processes. Continue to develop and validate source reduction in aircraft wash. Continue to develop and demonstrate alternative propulsion system technologies that minimize the use and generation of hazardous materials in operations, manufacturing and repair processes. Initiate development of low engine emissions technology. Complete development of non-chromated paint primers, non-HAP sealants, mobile paint stripping technology, non-HAPs pre-paint cleaner.

(U) ($0.290M) Continue to provide scientific and technical expertise for continued aviation pollution prevention technology development, demonstration and validation.
(U) ($0.535M) Continue to develop and demonstrate low-VOC, non-chromated adhesive bonding primers and aluminum-manganese as a cadmium replacement.
(U) ($0.445M) Complete development and demonstration of conversion coatings alternatives.
(U) ($0.280M) Continue development and demonstration of alternative ordnance materials and processes.
(U) ($0.412M) Continue development and demonstration of environmentally compatible Aircraft Launch and Recovery Equipment (ALRE) lubricants and certify processes that reduce their emission to the sea.
(U) ($0.008M) Portion of extramural program reserved for Small Business Innovation Research assessment in accordacne with 15 USC 638.

3. (U) FY 2002 PLAN:

(U) ($2.100M) Continue to research, develop, and test alternatives to aircraft manufacturing, finishing, repair and maintenance processes that use toxic heavy metals, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). Continue to formulate and certify newly developed aircraft coatings. Continue technology research development, demonstrations/validations of alternatives to chromium and cadmium electroplating processes. Continue to develop and validate source reduction in aircraft wash. Continue to develop and demonstrate alternative propulsion system technologies that minimize the use and generation of hazardous materials in operations, manufacturing and repair processes. Continue development of low engine emissions technology. Initiate testing of non-chrome anodize coatings. Initiate flight evaluations of high velocity oxy fuel (HVOF) coatings and non-chrome anodize coating. Initiate evaluations of environmentally compliant Sol-Gel materials. Initiate development of a low emissions combustor technology. Complete evaluation of zero VOC exterior aircraft coating. Complete development of aluminum-maganese coatings as cadmium plating replacements.

(U) ($0.331M) Continue to provide scientific and technical expertise for continued aviation pollution prevention technology development, demonstration and validation: initiate flight evaluation of a non-chrome anodizing technology.
(U) ($0.426M) Initiate evaluation of low-VOC bonding, peteroleum distilate (PD) solvent alternatives.
(U) ($0.426M) Initiate flight evaluations of conversion coating alternatives, aluminum manganese (Al/Mn) coatings.
(U) ($0.950M) Continue development and demonstration of alternative weapons and ordnance materials and processes.
(U) ($0.378M) Continue development and demonstration of environmentally acceptable ALRE technologies.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Environmental Compliance / W2210

B. (U) Other Program Funding Summary: Not applicable.

(U) RELATED RDT&E:
PE 0602233N (Readiness/Training/Environmental Quality)
PE 0603716D (Strategic Environmental R&D Program)
PE 0603851D (Environmental Security Technology Certification Program)
PE 0603721N (Environmental Quality & Logistics Advanced Technology)

C. (U) Acquisition Strategy: Technologies developed under this project are demonstrated and validated primarily through Competitive Procurements. Validated technology is transitioned to users through new or revised Performance Specifications, Technical Manuals or Competitive Procurements of subsystems, materials or processes.

D. (U) Schedule Profile:

FY00

Engineering Milestones
Complete Evaluation Waterborne Topcoats
Complete Evaluation Electrocoat & Powder Coat
Complete Development Flashjet
Complete Development Paint Purge Solvents
Complete Development Non-HAPs Chemical Strippers
Complete Development Zn-Ni Plating as Cd Replacement
Complete Development Sn-Zn Plating as Cd Replacement
Complete Evaluation CO2 Retrofit of Halon Extinguishers
Complete Evaluation Halon Releases During Bottle Maintenance
Initiate Development Alternative Ordnance Materials & Processes
Initiate Development Environmental Compatible ALRE Lubricants

FY01

Engineering Milestones
Complete Development Conv Coating Alternatives
Complete Development Non-Chromated Primers
Complete Development Non-HAP Sealants
Complete Development Mobile Paint Stripping Technology
Complete Evaluation Non-HAPs Prepaint Cleaner
Initiate Development Low Engine Emissions Technology

FY02

Engineering Milestones
Complete Development Al/Mn Coatings
Comp Eval Zero VOC Topcoat
Init Flight Eval Conv Coatings
Init Eval Low VOC Bonding
Init Eval PD Solvent Alt
Init Test Non-Chrome Anodized Coatings
Init Flight Eval Al/MnCoatings
Init Flight Eval HVOF Coatings
Init Eval Compliant Sol-Gel Mat
Init Dev Low Emiss Combustor
Init Flight Eval Non-Chrome Anodize

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**			PROGRAM ELEMENT **Environmental Protection / PE0603721N**			PROJECT NAME AND NUMBER Environmental Compliance /W2210						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering	WX	Various		1.664		1.974		1.773		Cont	Cont	Cont
	WX	NAWC-Pax		2.506		2.782		2.823		Cont	Cont	Cont
Subtotal Product Development			0.000	4.170		4.756		4.596		Cont	Cont	Cont
Remarks:												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not Applicable.												

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 2)											DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Environmental Protection / PE0603721N**			PROJECT NAME AND NUMBER Environmental Compliance /W2210						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												N/A
Operational Test & Evaluation												N/A
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		N/A
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support				0.010		0.012		0.015		Cont	Cont	Cont
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.010		0.012		0.015		0.000	Cont	
Remarks: Not applicable.												
Total Cost				4.180		4.768		4.611		Cont	Cont	Cont
Remarks:												

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Environmental Protection / PE0603721N**				PROJECT NAME AND NUMBER Pollution Abatement / Y0817					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Pollution Abatement / Y0817	**8.783**	**8.736**	**9.665**						**Cont**	**Cont**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: This project develops and validates new technologies needed to address pervasive Navy shoreside environmental requirements imposed on Naval shore activities by the need to comply with environmental laws, regulations, orders, and policies. The goal of the program is to minimize personnel liabilities, operational costs, and regulatory oversight while preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions. Each project task addresses one or more of the requirements from the Navy Environmental Quality RDT&E Strategic Plan of October 1994. The plan is being updated and upon Chief of Naval Operations approval it will govern future task selections. Project investment is made in five thrust areas:

(U) SHIP MAINTENANCE/REPAIR/DEACTIVATION

(U) Thus far, tasks in this thrust area have addressed environmental requirements originating at Naval shipyards. As the Navy pursues a strategy to reduce ship maintenance costs by shifting work to Ship Intermediate Maintenance Activities (SIMAs), new requirements are emerging as these processes and resulting hazardous waste streams become more decentralized. SIMAs will require technologies that are cost-effective when operated less frequently and with lower throughput. Future SIMA tasks will be selected based on compliance and pollution prevention studies being conducted on the Naval Station Mayport SIMA as part of the Navy Environmental Leadership Program (NELP) during FY 1999.

(U) ORDNANCE TESTING/MANUFACTURE/DISPOSAL

(U) Current tasks in this thrust address specific compliance-driven environmental requirements of Navy ordnance activities. With respect to disposal, the thrust addresses requirements for disposal of quan typical of testing and manufacturing operations, not of the much larger quantities associated with demilitarization. Future tasks will shift much of the investment in this area to pollution prevention requirements, particularly where they also reduce compliance impacts and costs. These tasks will be identified as part of an ordnance environmental requirements study being conducted in partnership with the Navy's Ordnance Environmental Specialty Office (OESO) during FY 1999.

(U) OTHER INDUSTRIAL OPERATIONS

(U) Tasks in this thrust address compliance and pollution prevention environmental requirements originating from the industrial operations of Navy Public Works Centers and Naval Stations. As part of an overall Navy strategy, future tasks will shift more of the investment from compliance technologies to pollution prevention technologies that are cost-effective solutions to compliance requirements. It is also expected that there will be new requirements driven by the trend towards stricter federal, state, and local air emission regulations.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Pollution Abatement /Y0817

(U) NON-INDUSTRIAL OPERATIONS

(U) Tasks in this thrust address requirements to reduce air and water emissions (CAA, CWA), hazardous waste (RCRA) generation, and cost of environmental compliance for non-industrial operations occurring at Naval activities. In addition, tasks evaluate alternative restoration technologies for the over 1000 Navy sites requiring cleanup and restoration under CERCLA. The alternative restoration tasks are selected and linked to the urgent requirements of specific restoration projects in partnership with the Navy's Alternative Restoration Technology Team (ARTT). It is expected that one area requiring new investment is technologies to reduce the long-term operation and monitoring costs of installation restoration projects.

(U) HAZARDOUS WASTE MINIMIZATION/RECYCLING/DISPOSAL

(U) Prior tasks have shown that the Navy neither has the funding required to acquire a new government-owned hazardous waste treatment system nor a large enough hazardous waste stream to make a new contractor-owned treatment systems profitable. Tasks now primarily address requirements to upgrade capabilities of Navy-owned industrial waste treatment plants (IWTPs) and/or to pre-treat Navy-generated wastes prior to being discharged to publicly-owned wastewater treatment systems (POWTS

1. (U) FY 2000 ACCOMPLISHMENTS

(U) ($1.964M) Ship Maintenance/Repair/Deactivation - Continued development of Automated Paint Application with Overspray Capture and Treatment. Continued development of Air Emission Reduction from Shipyard Cutting and Arc-Gouging Operations. Initiated development of Advanced Oil Spill Equipment. Initiated development of techniques for Real-Time Monitoring of Copper Effluents from dry-dock operations.

(U) ($2.000M) Ordnance Testing/Manufacture/Disposal - Completed ordnance environmental requirements study conducted in partnership with Navy's Ordnance Environmental Specialty Office (OESO). Continued development of Exhaust Scrubber for Static Testing of Small Rocker Motors: initiated fabrication of phase 2 prototype. Continued development of Confined Burn Facility to Replace Open Burning of Ordnances and Energetics.

(U) ($1.647M) Other Industrial Operations - Completed development of model for Engine Test Cell Emissions Reduction: completed validation of approaches to reduce nitrous oxide, particle, and noise emissions. Completed development of In-Line Monitoring and Diversion of Problem Contaminants in Discharges to automatically detect and divert occasional wastewater discharges with treatment-resistant contaminants. Completed development and evaluation of T-56 Gas Path Wastewater Treatment using modified Closed-Loop Aircraft Washrack Wastewater System developed in FY98. Initiated task to address requirements for Reduced Air Emissions from Diesel Engines.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Pollution Abatement /Y0817

(U) ($2.209M) Non-Industrial Operations - Completed development of QwikSed Marine Sediment Bioassays Using Bioluminescent Dinoflagellates. Completed development of Subsurface Contaminant Transport and DNAPL Sensor System. Completed development of Integrated Field Screening for Rapid Sediment Contaminant Characterization. Completed development of Pier-Side Oil Spill Detection System and conducted field demonstration in cooperation with ESTCP. Completed development of EnvironmentallySound Fire Fighting Training Facilities. Completed development of Reduced False Positive from Marine Sediment Bioassays. Continued development of Methods to Assess Subsurface Contaminant Migration from Coastal Landfills. Initiated two tasks, Toxicity Identification Evaluations (TIE) for Identifying Contaminants of Concern (CoCs) in Contaminated Sediments and Procedures for Determining Remediation Timeframes Associated with Monitored Natural Attenuation, to address requirements for reducing the long-term operation and monitoring costs of installation restoration projects.

(U) ($0.963M) Hazardous Waste Minimization/Recycling/Disposal- Completed development of Ozone Laundry Process for Recycling Contaminated Wipe Rags. Completed field demonstration of Cyanide Wastewater Treatment Technologies transitioned from Navy Exploratory Development (6.2) Program. Continued development of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Water. Initiated tasks for development of Total Toxic Organic Reduction from Navy Industrial Waste Treatment Plants (IWTPs) using advanced oxidation processes. Initiated task for Recycle/Recovery of Chromium Wastewaters discharged to Navy-Owned IWTPs.

2. (U) FY2001 PLAN:

(U) ($2.105M) Ship Maintenance/Repair/Deactivation- Continue development of Automated Paint Application with Overspray Capture and Treatment. Continue development of Air Emission Reduction from Shipyard Cutting and Arc-Gouging Operations. Continue development of Advanced Oil Spill Equipment. Continue development of techniques for Real-Time Monitoring of Copper Effluents from dry-dock operations.

(U) ($1.677M) Ordnance Testing/Manufacture/Disposal - Continue development of Exhaust Scrubber for Static Testing of Small Rocket Motors: complete fabrication of phase 2 prototype. Continue development of Confined Burn Facility to Replace Open Burning of Ordnance and Energetics: initiate tasks to address requirements identified as part of ordnance environmental requirements study conducted in partnership with Navy's Ordnance Environmental Specialty Office (OESO) during FY99.

(U) ($2.067M) Other Industrial Operations - Conduct validation of In-Line Monitoring and Diversion of Problem Contaminants in Discharges to automatically detect and divert occasional wastewater discharges with treatment-resistant contaminants. Continue task to address requirements for Reduced Air Emissions from Diesel Engines. Initiate tasks to address air emissions reductions requirements identified as part of update of Navy Environmental Quality RDT&E Strategic Plan completed during FY99.

(U) ($1.968M) Non-Industrial Operations - Continue development of Methods to Assess Subsurface Contaminant Migration from Coastal Landfills. Continue tasks, Toxicity Identification Evaluations (TIE) for Identifying Contaminants of Concern (CoCs) in Contaminated Sediments and Procedures for Determining Remediation Timeframes Associated with Monitored Natural Attenuation, to reduce long-term operation and monitoring costs of installation restoration projects as identified by updated Navy Environmental Quality RDT&E Strategic Plan completed during FY99.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Pollution Abatement /Y0817

(U) ($0.880M) Hazardous Waste Minimization/Recycling/Disposal- Continue development of Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants (IWTPs) using advanced oxidation processes. Continue development of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Water. Continue task for Recycle/Recovery of Chromium Wastewaters discharged to Navy-Owned IWTPs.

(U) ($0.039M) Portion of extramiral program reserved fro Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY2002 PLAN:

(U) ($2.324M) Ship Maintenance/Repair/Deactivation- Complete development of Automated Paint Application with Overspray Capture and Treatment. Complete development of Air Emission Reduction from Shipyard Cutting and Arc-Gouging Operations. Continue development of Advanced Oil Spill Equipment. Continue development of Real-Time Monitoring of Copper Effluents from dry-dock operations. Initiate tasks addressing Ship Intermediate Maintenance Activity (SIMA) requirements identified during compliance and pollution prevention studies conducted on Naval Station Mayport (SIMA) as part of Navy Environmental Leadership Program (NELP).

(U) ($1.836M) Ordnance Testing/Manufacture/Disposal - Continue development of Exhaust Scrubber for Static Testing of Small Rocket Motors. Continue development of Confined Burn Facility to Replace Open Burning of Ordnance and Energetics: continue tasks to address requirements identified as part of ordnance environmental requirements study conducted partnership with Navy's Ordnance Environmental Specialty Office (OESO).

(U) ($2.322M) Other Industrial Operations - Continue task to address requirements for Reduced Air Emissions from Diesel Engines. Continue tasks to address air emissions reductions requirements identified as part of update of Navy Environmental Quality RDT&E Strategic Plan completed during FY99. Initiate tasks to address shoreside requirements for aircraft and aircraft facilities maintenance needed to support the integrated maintenance concept (IMC).

(U) ($2.324M) Non-Industrial Operations - Continue development of Methods to Assess Subsurface Contaminant Migration from Coastal Landfills. Continue tasks, Toxicity Identification Evaluations (TIE) for Identifying Contaminants of Concern (CoCs) in Contaminated Sediments and Procedures for Determining Remediation Timeframes Associated with Monitored Natural Attenuation, to reduce long-term operation and monitoring costs of installation restoration projects as identified by updated Navy Environmental Quality RDT&E Strategic Plan completed during FY99.

(U) ($0.859M) Hazardous Waste Minimization/Recycling/Disposal - Complete development of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Water. Complete task for Recycle/Recovery of Chromium Wastewaters discharged to Navy-Owned IWTPs. Complete tasks for development of Total Toxic Organic Reduction from Navy Industrial Waste Treatment Plants (IWTPs) using advanced oxidation processes.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Pollution Abatement /Y0817

B. (U) Other Program Funding Summary: This project transitions technologies from PE0603712N, Environmental Quality, Logistics Advanced Technology Demonstrations Program, and PE0603716D, the Strategic Environmental Research and Development Program (SERDP). Whenever possible, funding is leveraged by transitioning technologies to PE 0603851D, the Environmental Security Technology Certification Program (ESTCP), for certification and by providing funding for Navy participation in ESTCP projects that could address Navy requirements. Within this program element, the project looks for fund leveraging opportunities with Project S0401 and W2210. Execution of this project is coordinated with related Army and Air Force programs by the Tri-Service Environmental Quality R&D Strategic Plan developed under the leadership of the Joint Engineers Management Panel (JEMP). Additional coordination occurs between the Army, Navy, and Air Force centers for environmental excellence.

(U) RELATED RDT&E: This project transitions shoreside pollution abatement technologies from two Navy Science and Technology programs and the Strategic Environmental Research and Development Program (SERDP). Project funding is leveraged by transitioning technologies to the Environmental Security Technology Certification Program (ESTCP) for final certification and by providing funding for Navy participation in ESTCP projects. Execution of this project is coordinated with related Army and Air Force programs by the Tri-Service Environmental Quality R&D Strategic Plan developedunder the leadership of the Joint Engineers Management Panel (JEMP).

(U) PE 0602233N, Readiness, Training, and Environmental Quality Technology Development
(U) PE 0603712N, Environmental Quality, Logistics Advanced Technology Demonstrations
(U) PE 0603716D, Strategic Environmental Research & Development Program (SERDP)
(U) PE 0603851D, Environmental Security Technology Certification Program (ESTCP)

C. (U) Acquisition Strategy: This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. Equipment products for Naval stations and other mission funded activities costing over 100K are often procured centrally through the Navy Pollution Prevention Equipment Program (PPEP) where as equipment products for Shipyards and other Navy Working Capital Fund (NWCF) activities costing over 100K are procured through their Capital Purchases Program (CPP). For both types of activities, equipment products costing less than 100K, and process changes not requiring the purchase of new equipment such as consumable material or product substitutions, are funded through the activity's operating budgets. Occasionally there is a technology that must be implemented as a specialized facility. These are acquired through the Military Construction (MCON) Program. All these acquisition processes are pursued using a common strategy that satisfies the needs of all the critical stakeholders: 1) Navy end user; 2) Funding sponsor for the Navy end user; 3) Cognizant environmentalfederal, state, and local regulators; 4) Other stakeholders with cognizance over the Navy process or operation being changed, and 5) The private or government organization that will produce the product.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Environmental Protection / PE0603721N**	PROJECT NAME AND NUMBER Pollution Abatement /Y0817

D. (U) Schedule Profile:

FY00

Ship Maintenance/Repair/Deactivation
Init Dev Advanced Oil Spill Equipment
Init Dev Real-Time Monitoring of Copper Effluents from Drydocks

Ordnance Testing/Manufacture/Disposal
Comp Ord Env Rqmts Study
Init Prototype Exhaust Scrubber for Static Testing of Small Rocket Motors

Other Industrial Operations
Comp Jet Engine Test Cell Emissions Reduction
Comp Dev In-Line Monitoring & Diversion of Problem Contam in Discharges
Comp Dev T-56 Gas Path Wastewater Treatment
Init Reduced Air Emission from Diesel Engines

Non-Industrial Operations
Comp QwikSet Marine Sediment Bioassays using Bioluminescent Dinoflagellates
Comp Subsurface Contam Transport & DNAPL Sensor System
Comp Integ Field Screening for Rapid Sediment Contam Characterization
Comp Pier-Side Oil Spill Detection System
Init Reduction of Long-Term Operation & Monitoring Costs of Installation Restoration

Hazardous Waste Minimization/Recycling/Disposal
Comp Dev of Contaminated Rag Ozone Recycling Process
Comp Trans Cyanide Wastewater Treatment Tech from Navy Expl Dev Prog
Init Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants
Init Recycle/Recovery of Chromium Wastewaters

FY01

Ship Maintenance/Repair/Deactivation

Ordnance Testing/Manufacture/Disposal
Comp Prototype Exhaust Scrubber for Static Testing of Small Rocket Motors

Other Industrial Operations
Comp Validation In-Line Monitoring & Diversion of Problem Contam in Discharges
Init Air Emission Reductions Under Navy EQ RDT&E Strategic Plan

Non-Industrial Operations

Hazardous Waste Minimization/Recycling/Disposal

FY02

Ship Maintenance/Repair/Deactivation
Comp Dev Automated Paint Application with Overspray Capture and Treatment
Comp Dev Air Emission Reduction from Shpyd Cutting & Arc-Gouging Operations
Init SIMA Compliance & Pollution Prevention Studies Under NELP

Ordnance Testing/Manufacture/Disposal

Other Industrial Operations
Init Tasks for Shoreside Aircraft & Aircraft Facilities Integrated Maintenance Concept

Non-Industrial Operations

Hazardous Waste Minimization/Recycling/Disposal
Comp Dev of Collection & Treatment Sys for Compensated Fuel Ballast Water
Comp Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants
Comp Recycle/Recovery of Chromium Wastewaters

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 1)

DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, BA4	**Environmental Protection / PE0603721N**	Pollution Abatement / Y0817

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Ship Maintenance/Repair/Deact	WR/PO	NSWC/CD	6.560	1.453	varies	1.828	varies	1.942	varies	Cont	Cont	N/A
Ship Maintenance/Repair/Deact	WR/PO	NFESC	3.880	0.506	varies	0.450	varies	0.485	varies	Cont	Cont	N/A
Ordnance Testing/Manufact/Disp	WR/PO	NSWC/IH	10.692	1.995	varies	1.818	varies	2.129	varies	Cont	Cont	N/A
Other Industrial Operations	WR/PO	NFESC	11.599	1.014	varies	1.386	varies	1.362	varies	Cont	Cont	N/A
Other Industrial Operations	WR/PO	SSC/SD	6.311	0.640	varies	0.625	varies	0.584	varies	Cont	Cont	N/A
Non-Industrial Operations	WR/PO	SSC/SD	10.975	1.435	varies	1.117	varies	1.275	varies	Cont	Cont	N/A
Non-Industrial Operations	WR/PO	NFESC	5.740	0.770	varies	0.705	varies	0.784	varies	Cont	Cont	N/A
Haz Waste Min/Recycle/Disp	WR/PO	NFESC	6.565	0.690	varies	0.625	varies	0.875	varies	Cont	Cont	N/A
Haz Waste Min/Recycle/Disp	WR/PO	NRL	1.968	0.280	varies	0.182	varies	0.229	varies	Cont	Cont	N/A
Subtotal Product Development			64.290	8.783		8.736		9.665				

Performing Activities: Naval Surface Warfare Center, Carderock Division (NSWC/CD), Naval Facilities Engineering Service Center (NFESC), Naval Surface Warfare Center, Indian Head Division (NSWC/IH), Space and Warfare Systems Center, San Diego (SSC/SC), Naval Research Laboratory (NRL).

Total Prior Years Cost: Summation starts with FY80. Subtotal does not include performing activities from prior years that are no longer performing activities.

Award Dates: About 55% of the project is executed via contracts awarded by the performing activities.

Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: Included in Product Development costs.

CLASSIFICATION:

EXHIBIT R-3, Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Environmental Protection / PE0603721N**			PROJECT NAME AND NUMBER Pollution Abatement / Y0817						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		
Remarks: Included in Product Development costs.												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.												
Total Cost			64.290	8.783		8.736		9.665		Cont	Cont	Cont
Remarks:												

FY 2002 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R0829 Energy Conservation (ADV)	2,692	2,782	2,843
R0838 Mobility Fuels (ADV)	2,090	2,165	2,182
R2766 Dehumidification Demo	1,945	-	-
R2868 Proton Exchange Membrane (PEM) Fuel Cells	-	2,972	-
TOTAL	6,719	7,869	5,025

FY 2002 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U)(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports projects to evaluate, adapt, and demonstrate energy related technologies for ship and aircraft operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) reduce energy costs; (c) reduce dependence on petroleum fuels and apply energy technologies that improve environmental compliance; (d) relax unnecessarily restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels when military specification fuels are unavailable or in short supply; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. Project R2766 is an FY2000 Congressional plus-up to demonstrate dessicant dehumidification in Naval Facilities. Project R2868 is an FY2001 Congressional plus-up to demonstrate Proton Exchange Membrane (PEM) Fuel Cell technology at a Department of Navy site. This program, and the companion PE 0604710N, Navy Energy Program support the achievement of legislated, White House, Department of Defense and Navy Energy Management Goals. It also responds to direction from the Office of the Secretary of Defense, the Secretary of the Navy and the Chief of Naval Operations to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

(U) PROGRAM CHANGE SUMMARY FOR TOTAL PE:

	FY 2000	FY2001	FY2002
(U) FY 2001 President's Budget:	6,945	4,942	5,090
(U) Appropriated Value:			
(U) Adjustments from PRESBUDG:			
(U) FY 2000 SBIR Adjustment	-100		

FY 2002 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) PE Rebalance			-7
(U) FY 2001 Congressional Plus-Up		3,000	
(U) NWCF Adjustments			-52
(U) Economic Assumptions	-28	-55	
(U) FY 2002 PRESBUD	6,817	7,887	5,031

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 2002 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R0829 Energy Conservation	2,692	2,732	2,840

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project improves the energy efficiency of Navy ships and aircraft, and thereby contributes to reduced operating costs and improved fleet sustainability and performance. Major efforts include work to increase the efficiency of aircraft engines; and develop improved hull drag reducing technologies and more efficient energy conversion systems for ships.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($1,050) Aircraft: A joint program with General Electric (GE), Navy F414 Engine Development program, Naval Aircraft Propulsion Science and Technology (S&T) program, and Energy R&D program was organized to develop advanced engine components sized for potential upgrade of the F404/F414 family of engines. The GE-23a Demonstrator Engine was chosen as the platform on which to demonstrate the new technology. The fan, high pressure compressor (HPC), high pressure turbine (HPT), low pressure turbine, and control systems will all be upgraded. The Energy R&D program, and GE jointly funded detailed design of the HPT, and preliminary design of the HPC. The Performance Seeking Control (PSC)

software developed by the Energy R&D program was tested on the F/A-18E/F simulator. Also, a contract for detailed design of the HPC was negotiated. Energy program participation incentivizes these efforts and ensures that efficiency, as well as performance gains are pursued.

- (U) ($1,642) Ships: Tow-tank tests of stern flap geometry for LHA-1/LHD-1 classes were conducted. Launched the Hull Design Database System (HDDS) by demonstrating it to all interested major US shipyards. HDDS is an interactive system by which hull form and propulsor trade-off affects on ship performance can be quickly evaluated. The HDDS database of tow tank and ship trials data was greatly expanded. Evaluated self-polishing reduced copper/cobiocide paints for copper release and binder hydrolysis rates. Performed technology trade-off study to identify manufacturer's independent research & development, and commercial technology that could improve LM2500 propulsion gas turbine engine operation and performance. Evaluated exhaust flow turning techniques to reduce back- pressure and improve efficiency of LM2500 engines.

2. (U) FY 2001 PROGRAM:

- (U) ($1,050) Aircraft: Continued participation in development of advanced engine components suitable for growth F414 engine. Contract for HPC detailed design is in place; the HPT is being fabricated by F414 Program. Components will be tested via the FY2004 GE-23a demonstrator engine build. Energy R&D participation incentivizes efficiency improvements. Evaluate fuel efficient component options for application to F404 variants (e.g. F/A-18C/D engine).

- (U) ($1,682) Ships: Evaluate effectiveness and maintenance requirements (application, repair and removal) of self-polishing reduced copper/cobiocide paints. Screen candidate paints by rates of copper release and binder hydrolysis-best paints will undergo large scale testing in PE 0604710N to demonstrate suitability for Navy use. Continue screening and model testing of simple hydrodynamic mods for future ships to improve energy efficiency: complete LSD-41/LSD-49 stern flap design. Complete posting of HDDS hydrodynamic design computer program on INTERNET; develop propeller design guidance for commercial shipyards. Complete technology application study to identify cost effective improvements for 501-K17/34 ship service turbo-generators.

- (U) ($25) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
   - (U) ($600) Aircraft: Complete HPC design for GE23a demonstrator engine core, transition to F414 program for fabrication.
   - (U) ($2,243) Ships: Continue screening of self-polishing reduced copper/cobiocde paints (and other advanced antifouling coatings) through laboratory tests of toxicant and binder release rates, and exposure testing on panels to determine application, maintenance and performance characteristics. Select promising candidates for large-scale testing via PE 0604710N. Develop improved correlations between model and full-scale tests for hull drag reducing appendages. Evaluate bow-fins for TA0-187 class ships. Evaluate benefits of digital fuel controls, compressor anti-degradation coatings and other cost-effective improvements for both 501-K34 turbogenerator and LM2500 main propulsion gas turbines.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602236N (Warfighter Sustainment Applied Research)
(U) PE 0603236N (Warfighter Sustainment Advanced Technology)
(U) PE 0603513N (Shipboard Systems Component Development)

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: MAY 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation(ADV)

(U) PE 0603573N (Advanced Surface Machinery Systems)
(U) PE 0603721N (Environmental Protection)
(U) PE 0604710N (Navy Energy Program (ENG))

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: MAY 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation(ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2000	FY2001	FY2002
a. System Development and Integration	2,692	2,732	2,843

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: MAY 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R0838 Mobility Fuels (ADV)	2,090	2,165	2,182

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides data through engine and fuel system tests which relate the effects of changes in Navy fuel procurement specification properties to the performance and reliability of Naval ship and aircraft engines and fuel systems. This information is required to: (a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; (b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military specification fuels are unavailable or in short supply; and (c) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. Recent problems with fuel quality have adversely affected ship and aircraft system performance and reliability and resulted in degradation of fuel in storage. The resulting readiness impacts, additional maintenance costs, and the cost of lost equipment, although difficult to quantify, are many times the cost of this project. Over the next decade, the potential for fuel quality related problems will increase because of changing industry practices required to comply with new environmental regulations. This project represents the only investment designed to maintain the Navy's ability to operate as a "smart" customer for fuels that cost over $2B per year to procure, transport, store and consume and are essential to fleet operations.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: MAY 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 Accomplishments:
   - (U) ($941) Ships: Continued task to determine effects of low-lubricity ship diesel fuels on the durability of Navy gas turbine engines, high-and medium-speed diesel engine fuel injection systems, and shipboard fuel handling systems. Completed bench-scale combustion rig tests to determine the effects of red-dyed commercial distillate marine fuels on Navy gas turbine hot section materials and coatings. Initiated phased tasks to determine the feasibility of specifying JP-5 (Naval jet fuel) as the single fuel for use by all Naval systems (ships, aircraft and ground equipment). Completed a study to determine the available technology and tasks necessary to remove gasoline from ships and replace with higher flashpoint fuels.
   - (U) (1,149) Aircraft: Completed development of prototype copper contamination removal system for jet fuels. Completed evaluation of the impact of +100 jet fuel thermal stability enhancement additive on F404 and F405 engines. Completed detailed cost benefit analysis for Naval use of +100 additives.

2. (U) FY 2001 Program
   - (U) ($990) Ships: Continued gas turbine engine, high-and medium-speed diesel engine fuel injection systems, and shipboard fuel handling systems component tests with low lubricity ship diesel fuels to determine effects on durability. Initiated evaluation of lubricity enhancing additives for use with low-lubricity ship diesel fuels. Completed Phase I task (availability and cost issues for JP-5) to determine the feasibility of specifying JP-5 as the single fuel for use by all Naval systems (ships, aircraft, and ground equipment). Initiated Phase II task (engine and fuel systems hardware maintenance issues, operational and shipboard impacts) to determine the feasibility of specifying JP-5 as the single fuel. Initiated work to quantify effects of low thermal stability Navy distillate fuels on maintenance requirements for navy gas turbine and diesel engines.
   - (U) ($1,175) Aircraft: Initiated evaluation of the impact of copper contaminated fuel and +100 additives on Naval Joint Strike Fighter engine performance and maintenance requirements. Initiated development of improved test devices

for shipboard fuel contamination and water detection. Conducted field testing of prototype copper contamination removal system. Initiated field evaluation of +100 compatible shipboard fuel/water separator elements. Completed evaluation of effects of +100 additive on F/A-18E/F and AV-8B engine systems.

- (U) ($14) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PROGRAM:

- (U) ($976) Ships: Complete testing of Navy gas turbine, high- and medium-speed diesel engine fuel injection systems, and shipboard fuel handling systems with low-lubricity ship diesel fuels. Use results to specify minimum lubricity levels and test methods to be used for fuel acceptance. Complete evaluation of lubricity enhancing additives for use with Navy distillate fuels. Continue component tests to determine effects of low thermal stability Navy distillate fuels on maintenance requirements for Navy gas turbine and diesel engines. Complete assessment of the feasibility of specifying JP-5 as the single fuel for use by all Naval Systems (ships, aircraft. and ground equipment).
- (U) ($1,206) Aircraft: Conduct shipboard evaluation of copper contamination removal system. Complete evaluation of the impact of copper contaminated fuel and +100 additives on Naval Joint Strike Fighter engine performance and maintenance requirements. Initiate JP-5 specification requirements and specification test review to determine and remove unnecessary requirements and increase worldwide availability. Evaluate prototype shipboard contamination and free water detection equipment.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: MAY 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

(U) PE 0601152N (In-House Laboratory Independent Research)
(U) PE 0205632N (Aviation Improvements)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: MAY 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2000	FY2001	FY2002
a. Reliability, Maintainability, and Availability	2,090	2,164	2,182

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

EXHIBIT R-2, RDT&E Budget Item Justification Sheet								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**		PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**				PROJECT NAME AND NUMBER Navy Facilities System/Y0995				
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**1.927**	**1.807**	**1.728**						**Cont.**	
Navy Facilities System/Y0995	**1.927**	**1.807**	**1.728**						**Cont.**	**Cont.**
RDT&E Articles Qty	**5**	**5**	**5**						**NA**	**NA**

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. There are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Real Property Maintenance (RPM) Programs. Project Y0995 is addressing four Navy facility requirements during the fiscal years FY 2000 through FY2002: The High Performance (HP) Magazine, Waterfront Facilities Repair and Upgrade, Facilities Technologies to Reduce the Real Property Maintenance (RPM) Backlog, and the Modular Hybrid Pier. The execution of this program is consistent with the findings and recommendation of two National Academy of Sciences Reports: "The Role of Federal Agencies in Fostering New Technology and Innovation in Building" and "Federal Policies to Foster Innovation and Improvement in Constructed Facilities."

B. (U) PROGRAM CHANGE SUMMARY:	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	1.974	1.824	1.719
(U) Appropriated Value:	1.985	1.824	
(U) Adjustments to FY 2000 Appropriated Value/FY 2001 President's Budget			
a. Across-the-Board Reduction	-0.011	0	0
b. DON adjustments	-0.047	-0.017	0.009
(U) FY 2002 PRES Budget Submit:	1.927	1.807	1.728

CHANGE SUMMARY EXPLANATION

(U) FY00: Funding: Reflects Across-the-Board reduction of $11K and DON adjustments of $47K.

(U) FY01: Funding: Reflects .7% Pro Rata reduction of $13K and a$ 4K recission reduction.

(U) FY02: Funding: Reflects POM reduction of $2K; DON NWCF Rate increase of $35K; OSD NWCF Rate reduction of $24K.

(U) Schedule: One year delay in completion of one Real Property Maintenance (RPM) technology validation.

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: Provided in Project Y0995 R-2a

D. (U) ACQUISITION STRATEGY: Provided in Project Y0995 R-2a

E. (U) SCHEDULE PROFILE: Provided in Project Y0995 R-2a

EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001 **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**		PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**								
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Navy Facilities System/Y0995	**1.927**	**1.807**	**1.728**						**Cont.**	**Cont.**
RDT&E Articles Qty	**5**	**5**	**5**	**6**	**TBD**	**TBD**	**TBD**	**TBD**	**NA**	**NA**

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. There are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Real Property Maintenance (RPM) Programs. This project is addressing four Navy facility requirements during the fiscal years FY 2000 through FY2002:

(U) THE HIGH PERFORMANCE (HP) MAGAZINE.

(U) Based on current magazine technologies, substantial land areas within Naval activities cannot be used for inhabited buildings in order to satisfy Explosives Safety Quantify Distance (ESQD). The converse is also true, the Navy is not able to locate new magazines where they are needed because of the proximity of inhabited buildings. This effort enables a quantification of the specific hazard scenarios capable of causing ordnance detonation, an improved capability to model an ordnance explosion in a magazine, and the innovative use of energy absorbing construction materials to provide a new magazine concept. The new magazine will have smaller ESQD arcs that are based on a Maximum Credible Event (MCE) that is not the detonation of the entire magazine but rather the detonation of the contents of one, much smaller, storage cell within the magazine. For a typical magazines with Net Explosive Weight (NEW) capabilities of 250,000 pounds, the allowable ordnance storage density is increased from 370 pounds/acre to 2,222 pounds/acre. In addition, the number of incompatible classes of ordnance that can be stored in the same magazine is incased from none to eight. This new magazine will also lead to lower operational costs for the Receipt, Segregation, Storage, and Issue (RSSI) of ordnance and, for some activities, a reduction in the number of magazines required to accomplish their mission.

(U) WATERFRONT FACILITIES REPAIR AND UPGRADE.

(U) Over 75% of the Navy's waterfront facilities are over 42 years old. They were designed for a service life of no more that 25 years and to satisfy the mission requirements existing at that time of construction. The reinforced concrete used to construct nearly all of them requires costly and repetitive repairs. In addition, to accomplish more pier side ship maintenance and thus reduce drydock costs, these piers must be strengthened to support concentrated crane loads up to 110 tons when they were designed for no concentrated loads. This effort new materials and design methods to extend the service life of existing waterfront facilities by an additional 15 or more years, and a new method to cost effectively upgrade the pier load capacity without resorting to demolition and replacement. Specific benefits include increasing the durability of concrete pier repairs from 3 to 15 +years for conventional concrete patches and composite enhanced repairs respectively, new longer-lasting low-maintenance fendering systems that eliminate the need for the frequent replacement of timber piles, a new Impulse Load Method (ILM) for accurately and quickly determining the vertical load capacity of piers and wharves, a new Swinging Weight Deflectometer (SWD) technique to determine the lateral stability of piers for earthquake forces and docking ship's impact. In total, for $1-2M of repairs and upgrades per pier, using this new technology, $50M for demolition and replacement is avoided.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001 **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**	PROJECT NAME AND NUMBER Navy Facilities System/Y0995

(U) FACILITY TECHNOLOGIES TO REDUCE THE REAL PROPERTY MAINTENANCE (RPM) BACKLOG.

(U) The Real Property Maintenance (RPM) costs to correct critical facility deficiencies are over $2.0B as reported in the FY 1995 Annual Inspection Summary (AIS). Current Navy RPM funding levels are insufficient to prevent the continued growth of the backlog of mission and safety critical maintenance and repairs. This effort will demonstrate and clearly validate the cost and reliability of advanced technologies in order to assure their acceptance and for implementation in traditionally conservative public works and maintenance and construction industries. The effort will accelerate the validation, commercialization, and wide-spread implementation of the facility technologies urgently required to reduce the cost of deficiencies in the Navy's RPM backlog by reducing initial construction costs up to 20% and facility components with service lives that are up to 25 years longer.

(U) MODULAR HYBRID PIER.

(U) The Navy is faced with the necessity of recapitalizing a large portion of its waterfront infrastructure over the next several decades. The Modular Hybrid Pier initiative develops and validates innovative material and design technologies for a mission-flexible waterfront infrastructure characterized by significantly reduced life cycle costs and increasing mission flexibility. The concepts validated by this project's Waterfront Facilities Repair and Upgrade initiative will enable the Navy to economically extend the useful service life of many existing piers and wharves. While reducing the need for immediate replacement, eventual replacement will be required. Emerging innovative materials technologies, particularly those that will transition from the Navy's Exploratory Development (6.2) Research Program, can provide a new capability to design replacement structures that have a comparable initial cost yet have far less maintenance and repair cost. Use of composite materials for appurtenances and high strength light-weight concrete for structural elements will produce structures that have twice the structural service life of the structures that they will replace. Modular design will enable off-site fabrication that will shorten the duration and lower the cost of the on-site construction. Modular design will also facilitate change-out of components to repair damage or to modify structure geometry or capacity to adapt to future changes in ship designs. An economic analysis has shown that a modular hybrid pier will have a Net Present Value (NPV) cost that is $8M less over its service life than that for a conventional structure constructed on steel-reinforced concrete.

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) ($0.185M) The High performance (HP) Magazine - Completed design of HP Magazine security system and obtained approval from DOD C3I that system meets requirements of DOD Directive 500.76M for storage of conventional AA&E. Completed definitive design for explosives safety features. Completed draft revisions to DOD Standard 6055.9 to add HP Magazine definition, siting criteria and ordnance groups. Revisions were approved by Department of Defense Explosive Safety Board (DDESB) at the January 2000 meeting.

(U) ($0.942M) Waterfront Repair and Upgrade - Initiated repair and strengthening of SUBASE Bangor Marginal Wharf using advanced composite material systems to validate performance in cold/wet environment.

(U) ($0.800M) Real Property Maintenance (RPM) Backlog Reduction - Initiated Jet-exhaust-resistantpavements at NAS Oceana for F18s. Initiated Full scale field test at NAS Roosevelt Roads, NAS Dallas/Fort Worth to validate performance of advanced Hangar Floor Coatings and supporting diagnostics. Completed data collection and initiated evaluation of Roofing Management System at NWS Charleston. Initiated large scale field test of concrete, containing an high percentage of fly ash in lieu of cement at NAS Point Mugu. Completed testing of commercially available void detection techniques for airfield pavement safety. Initiated field tests of advanced composites (fiber reinforced polymer (FRP)) building apurtenances for validating performance in exterior of marine structures. Initiated development for automating imaging and data processing for Airfield Pavement Condition Index (Auto PCI) surveys.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001 **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**	PROJECT NAME AND NUMBER Navy Facilities System/Y0995

2. (U) FY 2001 PLAN:

(U) ($0.671M) Waterfront Repair and Upgrade - Complete strengthening and performance testing of SUBASE Bangor Marginal Wharf. Develop documentation for implementation of new repair and strengthening (vertical & lateral) concepts by both NAVFAC and transfer of know-how to private sector. Initiate validation testing of Swinging Weight Deflectometer (SWD), the only device that measures lateral stability of piers.

(U) ($1.136M) Real Property Maintenance (RPM) Backlog Reduction - Complete performance testing of : precision condition survey system for Roof Management, Non-skid and high light reflectance safety coatings for A/C Maintenance Hangar Floors, Urethane Coating that cure in the presence of atmospheric moisture, extremely durable and more economical concrete for airfield and waterfront applications using high content of fly-ash substitute for cement, composite appurtenances for structure. Initiate validation testing of rapid scanning sensor for detecting voids (and weakness) under airfield pavements. Initiate the application of intelligent systems for measuring maintenance condition readiness of operating shoreside facility systems. Re-plan downstream programs to meet changes in priorities.

3. (U) FY 2002 PLAN:

(U) ($0.304M) Waterfront Repair and Upgrade - Complete validation testing and evaluation of Swinging Weight Deflectometer (SWD methods.

(U) ($0.930M) Real Property Maintenance (RPM) Backlog Reduction - Complete testing of advanced (more rapid and reliable) methods for airfield pavement subsurface void detection. Initiate field validation of several emerging high durability (low maintenance) coatings for highly corrosive "splash zone" environments. Initiate validation testing of composite applications in high temperature and high stress and cyclic fatigue applications for utilities, engine testing, etc. Initiate construction and maintenance quality control technologies (intelligent systems) to assure quality in acquisitions for readiness, reliability and safety of operational facilities.

(U) ($0.494M) Modular Hybrid Pier - Initiate conceptual design of modules and major assemblies transitioning from the related 6.2 Exploratory Development Program. Conduct constructability evaluations and tests.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001 **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**	PROJECT NAME AND NUMBER Navy Facilities System/Y0995

B. (U) OTHER PROGRAM FUNDING SUMMARY: This project transitions waterfront facility technologies from three Navy Exploratory Development (6.2) Research Programs: PE0602121N - Ship, Submarine and Logistics Technology, PE0602234N - Materials, Electronics and Computer Technology, and PE0603712N - Environmental Quality and Logistics Advanced Technology Demonstrations. It also transitions facility technologies developed at universities under the sponsorship of the National Science Foundation (NSF), by the Building and Fire Research Laboratory (BRL) of the National Institute of Standards and Technology (NIST), and by the Constructed Engineering Research Laboratories (CERL) and Waterways Experiment Station (WES) of the U. S. Army Corps of Engineers (USACOE) when they can contribute to the solution of one of the Navy requirements being addressed by this project. The project pursues opportunities to leverage private sector investment through partnerships with private sector organizations, such as the Civil Engineering Research Foundation (CERF) and the Composites Institute (CI) of The Society of the Plastics Industry (SPI). The project pursues opportunities to leverage Navy Real Property Maintenance (RPM) and Military Construction (MILCON) investment through partnerships with RPM and MILCON program and project managers .

C. (U) ACQUISITION STRATEGY: This project is categorized as Non-ACAT (Non Acquisition). The know-how produced from this project enables the safe and cost effective application of emerging/advanced technology concepts and products: 1) specifying or describing the performance, 2) enabling innovative design applications, 3) enabling quality control/quality assurance during constructions, 4) enabling reliability and maintainability during operations, and 5)developing lifecycle cost projections and environmental sustainability life cycle data for Navy policy guidance and criteria serving the Navy Real Property Maintenance (RPM) and Military Construction (MILCON) and other engineering/acquisition programs. The data from this program enables earliest and safe utilization of advanced technology for cost avoidance in the facilities infrastructure. The technical know-how of this program is transferred to the construction industry in supporting Navy construction and maintenance through the inclusion of individual firms (using competitive selection processes) and industry organizations/associations in the development and testing activities.
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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**	PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**	PROJECT NAME AND NUMBER Navy Facilities System/Y0995

D. (U) SCHEDULE PROFILE:

FY00	**FY01**	**FY02**
High Performance (HP) Magazine Complete all documentation for DDESB approval of siting criteria. Complete all documentation for DOD C3I approval of security system.		
Waterfront Facilities Repair and Upgrade Initiate repair & strengthening of SUBASE Bangor Marginal Wharf using composite materials. Complete pier and wharf capability upgrades using composites materials.	Complete performance validation tests at SUBASE Bangor Marginal Wharf. Develop implementation package for pier repair and strengthening systems. Initiate validation tests of Swinging Weight Deflectometer (SWD) to determine pier lateral load capacity.	Complete validation of SWD.
Real Property Maintenance (RPM) Backlog Reduction Continue testing MCU coatings, hangar floor coatings, F/A-18 resistant pavement, roofing management system. Initiate testing of fly-ash concrete,composites appurtenances, airfield pavement void detection system, auto PCI system. Determine fleet and NAVFAC requirements for FY01 technologies.	Complete validation testing of Roofing Management System, Hangar Floor Coatings, MCU coatings. Develop criteria, standards, and specifications for competitive procurement of these techs to accelerate use in RPM reduction. Continue performance tests of Airfield Void Detection System, composites, fly-ash concrete, and airfield auto PCI . Begin tech selection and reprioritization for 2002. Initiate validation tests of FY01.	Initiate large scale field tests of technologies reprioritized in FY01. Complete Airfield Void Deteection System, fly-ash concrete, concrete appurtenances, and auto PCI tests. Develop criteria standards, and specs for procurement. Begin tech selection and Develop criteria, standards, and planning for FY03.
Modular Hybrid Pier		Initiate conceptual design of modules and major assemblies.

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, BA4** | PROGRAM ELEMENT: **Facilities Improvement / PE0603725N** | PROJECT NAME AND NUMBER: Navy Facilities System/Y0995

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY00 Cost	FY00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
High Performance (HP) Magazine	WX	NFESC Pt. Hueneme, CA	3.906	0.181	10/99							
	WR	NSWC Indian Head, MD	0.045									
	WR	LANTDIV Norfolk, VA	0.337	0.012	06/00							
	WR	Navy PHS&T Earle, NJ	0.070									
	FP	Ricarl Design Camarillo, CA	0.012	0.007	06/00							
	FP	SVERDRUP St. Louis, MO	0.261									
	FP	Security Dsgn Sci Ventura, CA	0.003									
Waterfront Facilities Repair and Upgrade	WX	NFESC Pt. Hueneme, CA	1.228	0.598	10/99	0.621	10/00	0.251	10/01			
	WR	NUWC New London, CT	0.687									
	FP	Contractors TBD Locations TBD		0.331	08/00	0.050	03/01	0.051	03/02			
Real Property Maintenance (RPM) Backlog Reduction	WX	NFESC Pt. Hueneme, CA	0.704	0.618	10/99	0.792	10/00	0.651	10/01	cont.	cont.	na
	FP	CERF,Wash, DC	0.045									
	RC	LANTDIV Norfolk, VA	0.027									
	FP	N. State Univ. Aberdeen, SD	0.023									
	WR	PWD,NWS Charleston,SC	0.081									
	MIPR	Tyndall AFB Panama City,FL		0.005	02/00							
	FP	Contractors TBD Locations TBD		0.175	09/00	0.344	03/01	0.278	03/02	cont.	cont.	na
Modular Hybrid Pier	WX	NFESC Pt. Hueneme, CA						0.286	10/01	cont.	cont.	na
	FP	Contractors TBD Locations TBD						0.211	06/02			
Subtotal Product Development			7.429	1.927		1.807		1.728				

Remarks:

Total Prior Years Cost: Summation starts with FY94. Subtotal does not include performing activities from prior years that are no longer performing activities.

Exhibit R-3 Cost Analysis (page 2)									DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Facilities Improvement / PE0603725N**				PROJECT NAME AND NUMBER Navy Facilities System/Y0995					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		
Remarks: Included in Product Development costs.												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.												
Total Cost			7.429	1.927		1.807		1.728			Cont.	Cont.
Remarks:												

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**						R-1 ITEM NOMENCLATURE 0603739N Navy Logistic Productivity					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Total PE0603739N Cost		**17.428**	**12.909**	**11.735**						**Continuing**	**Continuing**
T1886 Rapid Retargeting		***6.778**	***3.475**							**Continuing**	**Continuing**
T2767 Virtual Systems Implementation Program		****6.778**	****5.958**							**Continuing**	**Continuing**
T2769 Compatible Processor Upgrade Program		*****3.872**	*****3.476**							**Continuing**	**Continuing**
T2920 Ordnance Management				**7.436**						**Continuing**	**Continuing**
W2955 JEDMICS				**4.299**						**Continuing**	**Continuing**
Quantity of RDT&E Articles **Not Applicable**											

* Rapid Retargeting is a Congressional add executed under project unit T1886 in FY 2000 and T2869 in FY 2001.
** Virtual Systems Implementation Program is a Congressional Add executed under project unit T2767 in FY2000 and FY 2001.
*** Compatible Processor Upgrade Program is a Congressional add excuted under project unit T2769 in FY 2000 and T2870 in FY 2001.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: In FY85 Congress directed the Services and Defense Logistics Agency to permanently capture, manage and control engineering data in digital format so it would be available to support competitive spares re-procurement. As of April 2000, the Joint Engineering Data Management Information & Control System (JEDMICS) program manages and controls 78,500,000 engineering images and has 24,000 authorized users responsible for over 70,000 user sessions per month. On average 2,100,000 digital images are retrieved each month. New data and new users are added each month as DoD re-engineers its business processes to take advantage of digital data that is managed and controlled for corporate reuse. The JEDMICS system is deployed at 29 interoperable sites that service 600 locations worldwide. Data stored in JEDMICS is used for Logistics Support, Spares re-procurement, Weapons Systems procurement, Engineering, Maintenance, Distribution, Manufacturing, Air National Guard and Deployed Engineering Technical Services organizations. JEDMICS facilitates work process re-design since its brings the electronic drawings to the desktop, shop floor or flight line in real time eliminating walk, wait and slack time to retrieve drawings. Additionally, Administrative Lead Time, Repair Turn Around Time, ECP processing time, demilitarization time, and all cycle times dependent on engineering data have decreased with the real time availability of digital engineering data. JEDMICS also facilitates Electronic Commerce since it produces digital technical data packages that can be forwarded along with an electronic order. Funds are for Commercial Off The Shelf (COTS) evaluation, integration, and test and evaluation. JEDMICS funds development efforts which are required to integrate COTS upgrades.

In addition this program covers the conversion of Naval Ammunition Logistics Center(NALC) systems to the Ordnance Information Systems(OIS)

This is not a new start. These upgrades were previously procured with Operation and Maintenance, Navy funding. Funding has been moved to RDT&E,N to comply with 28 Oct 99 OSD Comptroller and 2 Nov 99 ASN(FMC) direction clarifying use of RDT&E funds.

(U)B. JUSTIFICATION OF BUDGET ACTIVITY: This program is presently funded under DEMONSTRATION AND VALIDATION , which develops and integrates hardware for experimental tests related to specific ship or aircraft applications. However, the JEDMICS Program Office has requested the resource sponsor (N4) to reclassify JEDMICS as Budget Activity 7, Operational Systems Development, because it encompasses engineering and manufacturing development for upgrades of existing operational systems.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603739N Navy Logistic Productivity					PROJECT NUMBER AND NAME T2920 Ordnance Management					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**0.000**	**0.000**	**7.436**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**7.436**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Naval Ammunition Logistics Center(NALC) systems conversion to the Ordnance Information Systems(OIS): The OIS is an umbrella concept that integrates approximately 12 different functions that are currently produced by "stove-pipe" systems. OIS is an integrated suite of tools that uses the latest available information technology and best commercial practices to provide timely, relevant and accurate ordnance information and global ordnance visibility. It integrates wholesale, retail, and unique ordnance decision support systems to facilitate global ordnance positioning and information sharing across the DoN ordnance community to maximize warfighter support. Without a robust ordnance information system, the Navy and Marine Corps Aviation's ability to prevail in combat is jeopardized. This degradation will increase exponetially in the joint environment and the RDT&E initiatives listed herein are designed to ensure maximum Information Technology(IT) capability. Joint Ammunition Management Standard System (JAMSS).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS: Not Applicable

2. FY 2001 PLANS: Not Applicable

3. FY 2002 PLANS:
   - (U) ($2.916) For FY02, NALC plans to use a combination of software developement, training developement and configuration management for the following OIS systems: Retail Ordnance Logistics Management System(ROLMS), Receipts, Storage, Stowage, and Issue(RSS&I), Demil Program Support, Load Plan Support, Weapons Simulation, Ordnance Budget Planning, Ordnance Data Warehouse, Tomahawk Inventory System, Ordnance Asset Portfolio, and Conventional Ammunition Inventory Management System(CAIMS).
   - (U) ($4.520) Will allow each the Navy to contribute to developing common ammunition logistics management systems.

R-1 SHOPPING LIST - Item No. 77

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0603739N Navy Logistic Productivity	T2920 Ordnance Management

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	0	0	0
(U) Adjustments from the President's Budget:	0	0	7.436
(U) FY 2002/2003 DON Budget Submit:	0	0	7.436

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2002 net increase of $2.916M consists of a transfer of funds from O&M,N to RDT&E, N to provide upfront software and training developement along with configuration management support of the NALC's efforts to convert to the Ordnance Information System(OIS) and $4.520M for JAMSS.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) D. ACQUISITION STRATEGY: Not Applicable

R-1 SHOPPING LIST - Item No. 77

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0603739N Navy Logistic Productivity	PROJECT NUMBER AND NAME T2920 Ordnance Management	

(U) E. SCHEDULE PROFILE:

	FY 2000	FY 2001	FY 2002	TO COMPLETE
(U) Program Milestones			Oct 01 OIS Software Development Oct 01 OIS Configuration Management Support Nov 01 Ordnance Visibility System Programming Jan 02 OIS Training	
(U) Engineering Milestones				
(U) T&E Milestones				
(U) Contract Milestones				

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603739N Navy Logistic Productivity				PROJECT NUMBER AND NAME T2920 Ordnance Management						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Software Development						2.286					2.286	
Training Development						0.420					0.420	
Configuration Management						0.210					0.210	
JAMSS						4.520						
Total Support			0.000	0.000		7.436				0.000	7.436	

Remarks: The program has no Product Development, T&E, or Management Costs

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NUMBER AND NAME 0603739N Navy Logistic Productivity					PROJECT NUMBER AND NAME W2955 Joint Engineering Data Management Information & Control System (JEDMICS)					
COST ($ in Millions)	Prior Year Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost		**0.000**	**0.000***	**4.299**						**Continuing**	**Continuing**
RDT&E Articles Qty											

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: In FY85 Congress directed the Services and Defense Logistics Agency to permanently capture, manage and control engineering data in digital format so it would be available to support competitive spares re-procurement. As of April 2000, the Joint Engineering Data Management Information & Control System (JEDMICS) program manages and controls 78,500,000 engineering images and has 24,000 authorized users responsible for over 70,000 user sessions per month. On average 2,100,000 digital images are retrieved each month. New data and new users are added each month as DoD re-engineers its business processes to take advantage of digital data that is managed and controlled for corporate reuse. The JEDMICS system is deployed at 29 interoperable sites that service 600 locations worldwide. Data stored in JEDMICS is used for Logistics Support, Spares re-procurement, Weapons Systems procurement, Engineering, Maintenance, Distribution, Manufacturing, Air National Guard and Deployed Engineering Technical Services organizations. JEDMICS facilitates work process re-design since its brings the electronic drawings to the desktop, shop floor or flight line in real time eliminating walk, wait and slack time to retrieve drawings. Additionally, Administrative Lead Time, Repair Turn Around Time, ECP processing time, demilitarization time, and all cycle times dependent on engineering data have decreased with the real time availability of digital engineering data. JEDMICS also facilitates Electronic Commerce since it produces digital technical data packages that can be forwarded along with an electronic order. Funds are for Commercial Off The Shelf (COTS) evaluation and integration, and test and evaluation. JEDMICS funds development efforts which are required to integrate COTS upgrades. These upgrades were previously procured with Operation and Maintenance, Navy funding. Funding has been moved to RDT&E,N to comply with 28 Oct 99 OSD Comptroller and 2 Nov 99 ASN(FMC) direction clarifying use of RDT&E funds

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS: Not Applicable

2. FY 2001 PLANS:

(U)($3.496)(NonAdd) * Conduct development efforts associated with COTS obsolescence of the fully deployed COTS intensive JEDMICS system. Conduct COTS requirements definition, evaluation, integration and testing of baseline release. Continued technology insertion of the JEDMICS system will protect the $21B digital data asset managed in JEDMICS.

(U) ($ .153) (NonAdd) Conduct technical and configuration control reviews of JEDMICS system.

(U) ($ .551) (NonAdd) Conduct test and readiness and functional performance test reviews on JEDMICS system.

3. FY 2002 PLANS:

(U)($3.553) Conduct development efforts associated with COTS obsolescence of the fully deployed COTS intensive JEDMICS system. Conduct COTS requirements definition, evaluation, integration and testing of baseline release. Continued technology insertion of the JEDMICS system is required to protect the $21B digital data asset managed in JEDMICS.

(U) ($ .156) Conduct technical and configuration control reviews of JEDMICS system.

(U) ($ .576) Conduct test and readiness and functional performance test reviews on JEDMICS system.

* Request submitted for above threshold reprogramming of O&M,N funding to RDT&E,N to comply with 28 Oct 99 OSD Comptroller and 2 Nov 99 ASN(FMC) direction clarifying use of RDT&E funds.

R-1 SHOPPING LIST - Item No. 77

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **September 2000**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	PE0603739N Navy Logistic Productivity	W2955 Joint Engineering Data Management Information & Control System (JEDMICS)

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	0	0	0
(U) Adjustments from the President's Budget:	0	0	4.299
(U) FY 2002/2003 DON Budget Submit:	0	0	4.299

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2002 net increase of $4.283 million consists of a $4.306 million transfer of funds from O&M,N to RDT&E,N to conduct developmental efforts associated with COTS obsolescence of the fully deployed COTS intensive JEDMICS system offset by a reduction of $.007 million for reprioritization of requirements within the Navy.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
OPN BLI 331100, JEDMICS	16.9	11.9								

R-1 SHOPPING LIST - Item No. 77

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME	
RDT&E, N / BA-4	0603739N Navy Logistic Productivity	W2955 Joint Engineering Data Management Information & Control System (JEDMICS)	

(U) D. ACQUISITION STRATEGY: Contracting is via General Services Administration schedules with various vendors and are for software maintenance and COTS evaluation and integration. Performance base reviews are conducted quarterly by the PMO.

(U)E. SCHEDULE PROFILE:

	FY 2000	FY 2001	FY 2002	TO COMPLETE
(U) Program Milestones				CONTINUES
(U) Engineering Milestones			**May 02/Aug 02** Tech Rev Board/ Config Control Board Baseline Release 3.3	CONTINUES
(U) T&E Milestones			**Aug 02/Nov 02** Test Readiness Rev/ Func Perf Test Baseline Release 3.3	CONTINUES
(U) Contract Milestones			**Dec 01/March 02** Contract Award Baseline Release 3.3 Upgrades Orcle Databases to supportable versions& supports integration to replace obsolete COTS	CONTINUES

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603739N Navy Logistic Productivity				PROJECT NUMBER AND NAME W2955 Joint Engineering Data Management Information & Control System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Subtotal Product Development			0.000	0.000		0.000				0.000	0.000	
Remarks:												
Software Development	GSA/	Litton PRC/Reston, Va				3.567	10/01			Continuing	Continuing	
Subtotal Support			0.000	0.000		3.567				Continuing	Continuing	
Remarks: Funds are for development efforts associated with COTS obsolescence on the fully deployed COTS Intensive Joint Engineering Data Management Infomation & Control System (JEDMICS). Funds are for COTS evaulation, integration, and test and evaluation. The common baseline will be regained and obsolete COTS software and hardware will be replaced. Baseline releases will protect joint interoperability, upgrade operating systems for security patches and supportable versions, support integration to replace obsolete COTS, and upgrade the Oracle database to supportable versions.												

R-1 SHOPPING LIST - Item No. 77

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0603739N Navy Logistic Productivity				PROJECT NUMBER AND NAME W2955 Joint Engineering Data Management Information&Control System (JEDMICS)						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	GSA/T&M	Computer Svcs Corp.,FC,Va.				0.326	10/01			Continuing	Continuing	
Developmental Test & Evaluation	MIPR	AMCOM, Huntsville, Al				0.250	10/01			Continuing	Continuing	
Subtotal T&E			0.000	0.000		0.576				Continuing	Continuing	
Remarks:Supports testing of baseline releases in a user environment.												
Government Engineering Support	MIPR	CECOM, Va				0.156	10/01			Continuing	Continuing	
Subtotal Management			0.000	0.000		0.156				Continuing	Continuing	
Remarks:Support configuration and requirements management at the Prime Contractor location.												
Total Cost			0.000	0.000		4.299				Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 77

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **JUNE 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA 4**					R-1 ITEM NOMENCLATURE Ship Self Defense/0603755N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**9.628**	**6.550**	**8.353**						**CONT.**	**CONT.**
QRCC/RAWG 22133	**2.897**	**0.000**	**2.180**						**CONT.**	**CONT.**
Force AAW Coord. Tech. (FACT)/ K2184/U2184	**6.731**	**6.550**	**6.173**						**CONT.**	**CONT.**
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

This program incorporates efforts dedicated to the enhancement of ship self defense against Anti-Air Warfare (AAW) threats. Its primary focus is on the development of technologies, systems, and procedures necessary to defeat the evolving Anti-Ship Cruise Missile (ASCM) threat. These projects focus on ship defense improvements through the development of advanced concepts and capabilities that will enhance both defense in depth of ships in a force and self defense of individual ships in a littoral war fighting environment. Quick Reaction Combat Capability (QRCC), Project K2133, provides advanced concepts and technology developments for the multi-sensor integration of ship detection equipment, integration and coordination of ship self defense weapons, and coordination of hardkill and softkill assets to improve individual ship self defense capabilities against the ASCM threat. Beginning in FY02, the Requirements and Analysis Working Group (RAWG) provides independent analysis for a variety of combat system trade-offs, ship class performance studies, and force protection strategic plan development. Force Anti-Air Warfare Coordination Technology (FACT), Project K2184, demonstrates Force Anti-Air Warfare (AAW) concepts and capabilities which will enhance the AAW war-fighting ability of ships and aircraft and enable the coupling of the Force into a single, distributed AAW weapon system through more effective use of tactical data, and force sensors and weapons.

B. (U) Program Change Summary

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget Submit:	8.607	6.610	8.919
Appropriated Value:	8.654	6.610	
Adjustments to FY2000/2001 Appropriated Value			
FY2001 President's Budget:	0.974	-0.060	-0.566
FY 2002 PRES Budget Submit	9.628	6.550	8.353

Funding:
FY00: Program realignment (+$1.395)and congressional reductions of ($-.421)
FY01: Congressional Reductions ($-.060)
FY02: Program adjustments ($-.566)

EXHIBIT R-2a, RDT&E Project Justification							DATE: **JUNE 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA4**	PROGRAM ELEMENT NAME AND NUMBER **SHIP SELF DEFENSE 0603755N**				PROJECT NAME AND NUMBER Force AAW Coordination Technology K2184					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**6.731**	**6.550**	**6.173**						**CONT.**	**CONT.**
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: Force Anti-Air Warfare Coordination Technology (FACT) Program is an advanced development effort designed to demonstrate Force Anti-Air Warfare (AAW) concepts and capabilities which will significantly improve our Force defense in depth, including both local area and self defense capabilities against current and future AAW threats. FACT improvements are designed to enhance the AAW warfighting ability of ships and aircraft and to enable coupling of the Force into a single, distributed AAW weapon system and towards more effective use of tactical data and the cooperative use of all the force sensors and weapons. These capabilities will provide the ship defense flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile third world countries. FACT defines requirements and develops prototype systems or modifications to existing systems to test new concepts for the coordination of Force AAW operations. Some examples of prototype systems now in production are AN/SPS-48C Detection Data Converter, AN/SPS-48E Environmental Control Feature, Shipboard Gridlock System Automatic Correlation (SGS/AC) and Dial-a-Track Link-11 Quality Selection. Other FACT developments nearing production stages are the Automatic Identification System (Auto-ID) and the Multi-Frequency Link-11 capability; Dual Net Multi-Frequency Line (DNMFL); Force Threat Evaluation Weapons Assignment (FTEWA); and the prototype Area Air Defense Commander (AADC) capability. Short and long term objectives will be phased in to produce higher degrees of ship defense and battle coordination and effectiveness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY00 ACCOMPLISHMENTS:

- (U) ($1.331) Continued concept development of advanced air defense command and control capabilities, including development of concepts to support CAP/SAM coordination, Joint Fires airspace coordination, coordinated cooperative engagements, and advanced air defense capabilities, including Upper Tier Systems.
- (U) ($0.852) Provided support for landbased and at-sea experiments of advanced Command and Control systems to evaluate air defense concepts and capabilities, including multi-TADIL operations, and air defense operations.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA4	**SHIP SELF DEFENSE 0603755N**	Force AAW Coordination Technology K2184

(U) FY00 ACCOMPLISHMENTS Continued:
- (U) ($1.000) Developed concepts and capabilities to support the integration of Multi-TADIL and cooperative engagement networks across Joint air defense systems, improve Navy and Joint Link interoperability.
- (U) ($0.150) Provided top-level programmatic support, technical analysis, and assist in the development of processes, procedures, and documentation that impacted the execution of the FACT program requirements.
- (U) ($3.398) Developed concepts and defined requirements for detection, control and engagement of time sensitive targets beyond the Fire Support Coordination Line (FSCL).

U) FY01 PLAN:
- (U) ($.173) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) ($0.806) Support landbased and at-sea experiments of advanced Command and Control systems, and conduct analysis to evaluate air defense concepts and capabilities to evaluate capabilities, including multi-TADIL operations, and air defense operations.
- (U) ($0.150) Provided top-level programmatic support, technical analysis, and assist in the development of processes, procedures, and documentation that impact the execution of the FACT program requirements.
- (U) ($1.000) Develop concepts and capabilities to support the integration of Multi-TADIL and cooperative engagement networks across Joint air defense systems, improve Navy and Joint Link interoperability.
- (U) ($4.421) Develop concepts and define requirements for detection, control and engagement of time sensitive targets beyond the Fire Support Coordination Line (FSCL).

(U) FY02 PLAN:
- (U) ($5.173) Development of the Joint Targeting, Attack and Assessment Capability (JTAAC). Test the basic JTAAC prototype at JHU/APL and refine it as necessary.
- (U) ($0.850) Support land based and at-sea experiments of advanced Command and Control systems, and conduct analysis to evaluate air defense concepts and capabilities, including multi-TADIL operations and air defense operations.
- (U) ($0.150) Provide top-level programmatic support, technical analysis, and assist in the development of processes, procedures, and documentation that impact the execution fo the FACT program requirements.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N BA4	**SHIP SELF DEFENSE 0603755N**	Force AAW Coordination Technology K2184	

B. Other Program Funding Summary: Not Applicable

C. Acquisition Strategy: Not Applicable

D. Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1) | DATE: **JUNE 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N BA4** | PROGRAM ELEMENT: **SHIP SELF DEFENSE 0603755N** | PROJECT NAME AND NUMBER: Force AAW Coordination Technology K2184

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF	APL/LAUREL, MD	58.248	6.431	11/99	5.405	11/00	5.173		CONT.	CONT	
Systems Engineering		SPAWAR, S.D.	0.150							0.000	0.150	
Systems Engineering		SPAWAR, NORFOLK	0.417							0.000	0.417	
Systems Engineering		PUGET SOUND BOSTON	0.029							0.000	0.029	
Tooling												
GFE												
Award Fees												
Subtotal Product Development			58.844	6.431		5.405		5.173		CONT.	CONT	

Remarks:

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support		NSWC/PHD	0.175							0.000	0.175	
Integrated Logistics Support		NSLC MECH. PA	0.005							0.000	0.005	
Integrated Logistics Support	GSA	AMERIND	0.111							0.000	0.111	
Configuration Management												
Technical Data		NSWC/DD, DAHLGREN, VA		0.150	01/00					0.000	0.150	
GFE												
Subtotal Support			0.291	0.150		0.000		0.000		0.000	0.441	

Remarks:

Exhibit R-3 Cost Analysis (page 2) | DATE: **JUNE 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N BA4** | PROGRAM ELEMENT: **SHIP SELF DEFENSE 0603755N** | PROJECT NAME AND NUMBER: Force AAW Coordination Technology K2184

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation	CPFF	APL/LAUREL, MD				0.806		0.850		CONT.	CONT.	
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.806		0.850		CONT.	CONT.	
Remarks:												
Contractor Engineering Support	CPAF	RGE, SPRINGFIELD, VA	0.006							0.000	0.006	
Contractor Engineering Support	CPFF	SPA, FAIRFAX, VA	0.100							0.000	0.100	
Contractor Engineering Support	CPFF	LOGICON,FALLS CHUR, VA	0.060							0.000	0.060	
Contractor Engineering Support	GSA	STRATEGIC INSIGHT, VA				0.189						
Program Management Support	GSA	DSR, FAIRFAX, VA		0.150	04/00	0.150	11/00	0.150		CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.166	0.150		0.339		0.150		CONT.	CONT.	
Remarks:												
Total Cost			59.301	6.731		6.550		6.173		CONT.	CONT.	CONT.
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **JUNE 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA4**	PROGRAM ELEMENT NAME AND NUMBER **SHIP SELF DEFENSE 0603755N**				PROJECT NAME AND NUMBER Quick Reaction Combat Capability/Requirements and Analysis Working Group/22133					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**2.897**	**0.000**	**2.180**						**CONT.**	**CONT.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: Quick Reation Combat Capability (QRCC) provides advanced concepts and technology developments for the multi-sensor integration of ship detection equipment, integration and coordination of ship self defense weapons, and coordination of hardkill and softkill assets to improve individual ship self defense capabilities against the ASCM threat. The funding for the Self Defense Test Ship is for the dry-docking and overhaul of the Self Defense Test Ship to extend the service life for another 4 years. The Requirements and Analysis Working Group (RAWG) provides independent analysis for a variety of combat system trade-offs, ship class performance studies, and force protection strategic plan development.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
   (U) (2.897) Provided dry-docking and overhaul of the Self Defense Test Ship.

2. (U) FY 2001 PLAN:
   Not Applicable.

3. (U) FY 2002 PLAN:
   (U) (2.180) The RAWG will provide independent analysis for a variety of combat system trade-offs, ship class performance studies, and force protection strategic plan development.

B. Other Program Funding Summary: Not Applicable

C. Acquisition Strategy: Not Applicable

D. Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1)											DATE: **JUNE 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA4**			PROGRAM ELEMENT **SHIP SELF DEFENSE 0603755N**			PROJECT NAME AND NUMBER Quick Reaction Combat Capability/Requirements and Analysis Working Group/22133							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
Primary Hardware Development													
Ancillary Hardware Development													
Systems Engineering	Various	Various	4.955							0.000	4.955		
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development			4.955	0.000		0.000		0.000		0.000	4.955		
Remarks:													
Development Support Equipment													
Software Development													
Training Development													
Integrated Logistics Support													
Configuration Management													
Technical Data													
GFE													
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000		
Remarks:													

Exhibit R-3 Cost Analysis (page 2) | DATE: **JUNE 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N BA4** | PROGRAM ELEMENT: **SHIP SELF DEFENSE 0603755N** | PROJECT NAME AND NUMBER: Quick Reaction Combat Capability/Requirements and Analysis Working Group/22133

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation		Various	4.732	2.897		0.000		2.180		CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			4.732	2.897		0.000		2.180		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support				0.000		0.000				CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Total Cost			9.687	2.897		0.000		2.180		CONT.	CONT.	CONT.
Remarks:												

FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2293 NATO Cooperative Research and Development (R&D)	5,118	8,909	11,551						CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides funding for the continuation of on-going research and development identification and projects between the U.S. Navy and allies under Assistant Secretary of Navy (Research, Development and Acquisition) or Under Secretary of Defense (Acquisition and Technology) signed international agreements in accordance with Title 10 U.S. Code Section 2350a. Many of these projects were initiated under Office of the Secretary of Defense PE 0603790D in prior years.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($2,176) Supported work on the Vector Project between the U.S. and Germany.
- (U) ($ 234) Supported Fiber Optic Bottom Mounted Acoustic Array.

- (U) ($ 451) Supported efforts on the Multilateral Memorandum of Understanding for Interoperable Network for Secure Communications.
- (U) ($ 176) Supported on-going work related to the U.S./United Kingdom Anti-Torpedo Torpedo Cooperative R&D Project.
- (U) ($ 582) Supported on-going Navy efforts on the U.S./Japanese Cooperative Material Project for Advanced Steel initiated with OSD funding.
- (U) ($ 234) Supported work on the Unmanned Undersea Vehicle (UUV) Cooperative R&D Project between the U.S. and France initiated with OSD funding.
- (U) ($1,265) Supported on-going work related to the Cooperative R&D Project between the U.S. and United Kingdom for Timaran Hull initiated with OSD funding.

2. (U) FY 2001 PLAN:

- (U) ($3,330) Support work on the Vector Project between the U.S. and Germany.
- (U) ($ 200) Support Fiber Optic Bottom Mounted Acoustic Array between the U.S. and United Kingdom.
- (U) ($ 700) Support efforts on the Multilateral Memorandum of Understanding for Interoperable Network for Secure Communications.
- (U) ($ 330) Support work on the Six (6) Degrees of Freedom Ship Roll Project with Italy.
- (U) ($ 330) Support efforts on the Multilateral Memorandum of Understanding for Standard Missle Family.
- (U) ($ 890) Support work on the Multilateral Torpedo Tripwire Defense System.
- (U) ($1,000) Support work on the UUV for Mine Countermeasure Project with the United Kingdom.
- (U) ($ 112) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) ($ 520) Support Improved Submarine Launched Mobile Mine with Australia.

- (U) ($ 387) Support the Harpoon Enhancement Evaluation with Israel.
- (U) ($1,110) Support the Multilateral LW-155MM Howitzer Program.

3. (U) FY 2002 PLAN:

- (U) ($ 896) Support efforts on the Multilateral Memorandum of Understanding for Interoperable Network for Secure Communications.
- (U) ($ 896) Support work on the Six (6) Degrees of Freedom Ship Roll Project between the U.S. and Italy.
- (U) ($1,678) Support efforts on the Multilateral Memorandum of Understanding for Standard Missile Family.
- (U) ($2,255) Support work on the Multilateral Torpedo Tripwire Defense System.
- (U) ($1,455) Support work on the UUV for Mine Countermeasure Project with the United Kingdom.
- (U) ($ 112) Support the Harpoon Enhancement Evaluation with Israel.
- (U) ($1,678) Support Improved Submarine Launched Mobile Mine with Australia.
- (U) ($ 786) Support the Software Radio Project with Japan.
- (U) ($ 675) Support the Naval Command, Control and Combat Systems interoperability program with the United Kingdom.
- (U) ($1,120) Support the Mobile Scutter Program with Israel.

FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

B. (U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	5,431	8,992	11,565
(U) Appropriated Value:			
(U) Adjustments from PRESBUDG:			
(U) Program Adjustment			-14
(U) NWCF Rate Adjustments			-16
(U) SBIR Adjustment	-86		
(U) Reprogramming Adjustment	-206		
(U) Congressional Rescission	-21	-83	
(U) Non-Pay Inflation Adjustments			16
(U) FY 2002 President's Budget Submission:	5,118	8,909	11,551

(U) CHANGE SUMMARY EXPLANATION:
(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0603790D (NATO Cooperative Research and Development)
(U) PE 0605853N (Management, Technical and International Support)
(U) PE 0605130D (Foreign Comparative Testing)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2000	FY 2001	FY 2002
a. Cooperative Research and Development	5,118	8,909	11,551

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION:

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	FY 2000 Budget	FY 2001 Budget	FY 2002 Budget	To Complete	Total Program
Product Development									
NAVSEA	PD				582	850	3,356	CONT.	CONT.
NSWC-CD	WX				1,265	330	896	CONT.	CONT.
NUWC	WX				234	1,000	1,455		
Miscellaneous					627	2,812	4,271	CONT.	CONT.
NAVAIR	PD				2,176	3,330	0		

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	FY 2000 Budget	FY 2001 Budget	FY 2002 Budget	To Complete	Total Program
Support and Management									
NRL	WX				234	587	112	CONT.	CONT.

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	FY 2000 Budget	FY 2001 Budget	FY 2002 Budget	To Complete	Total Program
Test and Evaluation									
SPAWAR	PD				0	0	1,461	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: June 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

	FY 2000 Budget	FY 2001 Budget	FY 2002 Budget	To Complete	Total Program
Subtotal Product Development	4,884	8,322	9,978	CONT.	CONT.
Subtotal Support and Management	234	587	112	0	0
Subtotal Test and Evaluation	0	0	1,461	0	0
Total Project	5,118	8,909	11,551	CONT.	CONT.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification				DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**			R-1 ITEM NOMENCLATURE **Land Attack Technology/0603795N**							
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	**129.300**	**138.956**	**130.993**							
NSFS/32156/32624*	**66.183**	**58.428**	**42.679**							
ALAM/32324	**2.475**	**8.925**	**0.000**							
NFCS/32325	**24.599**	**48.575**	**48.835**							
LASM/K2409	**20.676**	**22.035**	**34.483**							
NSWC Continuous Processor/K2771 **	**5.867**	**0.000**	**0.000**							
NFN/32927 ***	**9.500**	**0.993**	**4.996**							
Quantity of RDT&E Articles & Cost (see attached projects)										

* Funding includes the following Congressional adds for ERGM Projects 32624/K2624: FY 2000 $9.695M; FY 2000 ERGM BAA $4.961M; FY 2001 $6.951M

** FY 2000 Congressional add for Continuous Processor Project K2771, Naval Surface Warfare Center, Indian Head

*** Funding includes the following adds for Naval Fires Network Project 32927/K2927: FY 2000 Omnibus ATR $9.5M; FY 2001 Congressional add $.993M

A. (U) Mission Description and Budget Item Justification: The Land Attack Technology program element supports the Naval Surface Fire Support (NSFS) mission. In order to meet the United States Marine Corp (USMC) requirements for NSFS in support of Operational Maneuvers from the Sea (OMFTS), the Navy is developing a variety of weapons systems including both gun and missile systems that can provide the required range, lethality, accuracy, and responsiveness. The NSFS program (**Project 32156/32624**) develops gun systems including the 5"/62 gun (a modification of the existing 5"/54 gun); a 5" Extended Range Guided Munition (ERGM) with a coupled internal Global Positioning System (GPS) and Inertial Navigation System (INS) capable of delivering a submunition payload to a range in excess of current capability; and associated propelling charge improvements. The Naval Fires Network (NFN) **(Project 32927)** is a system which will automate, coordinate, and correlate, in a real time fashion, the processing of multiple tactical data streams from various surveillance/intelligence sources to provide time-critical fire control solutions for advanced weapon systems and sensors. The automation/correlation provided by NFN will provide the Navy an ability to quickly target and re-target precision weapons, greatly enhancing their effectiveness and lethality. In order to satisfy USMC requirements for longer range, responsive fire support, the Navy is developing the Land Attack Standard Missile (LASM) (**Project K2409)**, a variant of the proven Standard Missile. In addition, the Advance Land Attack Missile (ALAM) (**Project 32324**) is being developed to expand the interim LASM capability using updated technology to fully meet extended range requirements and service the land attack target set as derived from the OMFTS strategy. The Naval Fires Control System (NFCS) (**Project 32325**) develops systems that will support mission planning for 5"/62 – ERGM and Land Attack Missiles. It will automate shipboard land attack battle management duties to be interoperable and consistent with joint C4ISR systems. These shipboard weapon systems will significantly improve the Navy's ability to support OMFTS. The Land Attack Technlogy program element also includes the transition of Advance Technology Demonstrations (ATDs) and Pre-Planned Product Improvements (P3Is) into the NSFS program. In FY 2000 this program element included a Congressional addition for the Continuous Processor, Naval Surface Warfare Center, Indian Head (NSWC IH) (**Project K2771**). The continuous processor program supports the advancement and implementation of a lower cost, safer, and less polluting technology for the manufacturing of energetics that will benefit many Navy systems that rely on energetic materials to meet their operational requirements.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE **Land Attack Technology/0603795N**

B. (U) Program Change Summary:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	116.839	143.044	125.772
(U) Appropriated Value:	117.489	140.244	
(U) Adjustment to FY 2000/2001 Appropriated Value			
FY 2001 President's Budget:	11.811	-1.288	5.221
(U) FY 2002 PRES Budget:	129.300	138.956	130.993

Funding:
FY 2000: Adjustments due to: Across-The-Board reductions (-$.649M), SBIR Tax (-$.327M), Mid-Year Review Adj. (+$3.025M), Misc Realignments/Actuals (-$.256M), ALAM Add (+$.975M), Proportionate Recission Adj. (-$.457M), and NFN Omnibus ATR (+$9.500M).
FY 2001: Adjustments due to: Gov't Wide Rescission (-$.306M), and .7% Pro-Rata Reductions (-$.982M).
FY 2002: Adjustments due to: ERGM add (+$10.000M), ALAM reduction (-$33.135M), NFCS adj. (+$8.300M), LASM adj. (+$15.300M), NFN add (+$5.000M), Final POM02 Balance reductions (-$.161M), Non Pay Inflation Adj. (+.176M), NWCF Rate Reductions (-$.684M), and Program Supp (+$.425M).

Schedule: The Land Attack Technology PE comprises multiple programs to provide a Naval Surface Fire Support capability. The challenge is the coordinated delivery of Mk 45 Mod 4 Gun System, the Extended Range Guided Munition, the Mk 160 Fire Control upgrades, the Propelling Charge upgrade and the Naval Fires Control System t together provide a significant enhancement to Naval Surface Fire Support. Technical challenges and the decision of the prime contractor to close its developmental plant in Lewisville, TX and moved ERGM related development activities to Tucson, AZ caused delays in the ERGM program and subsequently impacting the other programs and t NSFS capability. The Government recently restructured the ERGM contract with RMS and signed a contract modification on 11 Dec 2000. The contract was restructured moved the IOC from FY04 to FY05 to make the program more affordable. This change stretched out all ERGM development activity including CDR, Opeval Round Procurement, LRIP, Techeval, Opeval and MSIII. Following the restructured contract modification, RMS recently successfully completed its first flight demonstration of the ERGM on schedule which bodes well for meeting the restructured contract schedule and supporting an FY05 IOC.

Technical: N/A

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification					DATE: **June 2001**					
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	**Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Naval Surface Fire Support/32156/32624					
COST ($ in Millions)	FY 2000*	FY 2001**	FY 2002							
Project Cost	66.183	58.428	42.679							
RDT&E Articles Qty										

* Funding includes the following Congressional Adds for ERGM Project K2624: FY 2000 $9.695M; FY 2000 ERGM BAA $4.961M

** Funding includes FY 2001 ERGM Congressional add $6.951M

A. (U) Mission Description and Budget Item Justification: These funds provide for the development of the 5"/62 Extended Range Guided Munition (ERGM) weapons system which consists of a: 5" MK 45 gun modification which strengthens the gun to accommodate higher firing loads (18 megajoules) to fire the EX 171 Extended Range Guided Munition (ERGM); ERGM, a 5" munition with an internal Global Positioning System receiver coupled with an inertial Navigation System capable of delivering a submunitions to ranges in excess of 41NM; a gun fire control system which updates the MK 160 MOD 7 to a MOD 8 providing direct digital interface with the gun as well as the ERGM; and an upgraded propelling charge to provide the higher gun firing energy required by ERGM. This project also includes the transition of ATDs and P^3Is into the NSFS envelope.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($45.716) Continued development of EX-171 EDMs for ERGM. Continue rocket motor testing and component integration.
- (U) ($ 3.961) ERGM Broad Agency Announcement.
- (U) ($ 1.612) Continued development of EX-167 Propelling Charge.
- (U) ($11.829) Continued development and testing of 5" MK 45 Modification and GFP preparation.
- (U) ($ 2.565) Continued development and testing of the Gun Fire Control modification and required interfaces.
- (U) ($ 0.500) Continued development of the Micro-Electro-Mechanical System (MEMS).

2. (U) FY 2001 PLAN:
- (U) ($39.361) Begin transition from design to validation and test of ERGM design. Conduct program manuever flights of EDM ERGMs.
- (U) ($ 6.951) ERGM Broad Agency Announcement.
- (U) ($ 1.610) Begin transition from development to validation of EX-167 Propelling Charge.
- (U) ($ 8.371) Continue development and testing of 5" MK 45 modification and GFP preparation.
- (U) ($ 1.292) Continue development and testing of the Gun Fire Control Modification and required interfaces.
- (U) ($ .843) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Techology/0603795N**	PROJECT NAME AND NUMBER Naval Surface Fire Support/32156/32624

3. (U) FY 2002 PLAN:
- (U) ($34.038) Continue development of EX-171 EDMs for ERGM. Continue rocket motor testing and component integration.
- (U) ($ 1.144) Continue development of EX-167 Propelling Charge.
- (U) ($ 6.488) Continue development and testing of 5" MK 45 modification and GFM preparation. Continue test firing of the modification.
- (U) ($ 1.009) Continue development and testing of the Gun Fire Control Modification and required interfaces.

B. (U) Other Program Funding Summary:

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
PAN,MC BL, 025300	2.984	5.670	5.151						CONT.	CONT.
WPN BLI:4217, SBHD A4E5	26.359	2.756	26.275						CONT.	CONT.
SCN SBHD A224	35.228	36.241	24.868						CONT.	CONT.

(U) Related RDT&E,N: N/A

C. (U) Acquisition Strategy: A competition was held in FY 96 for the ERGM. It resulted in an award to Texas Instruments (now Raytheon Missile Systems) with a corporate investment of $55M for development cost. The gun is being developed under a sole source arrangement with United Defense, the current 5"/54 MK 45 MOD 2 producer. The Fire Control (MK 160) and the propelling charge are being developed by the Naval Surface Warfare Center, Indian Head since these system changes are modifications to current government owned/supplied equipment.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Naval Surface Fire Support/32156/32624

D. (U) Schedule Profile:

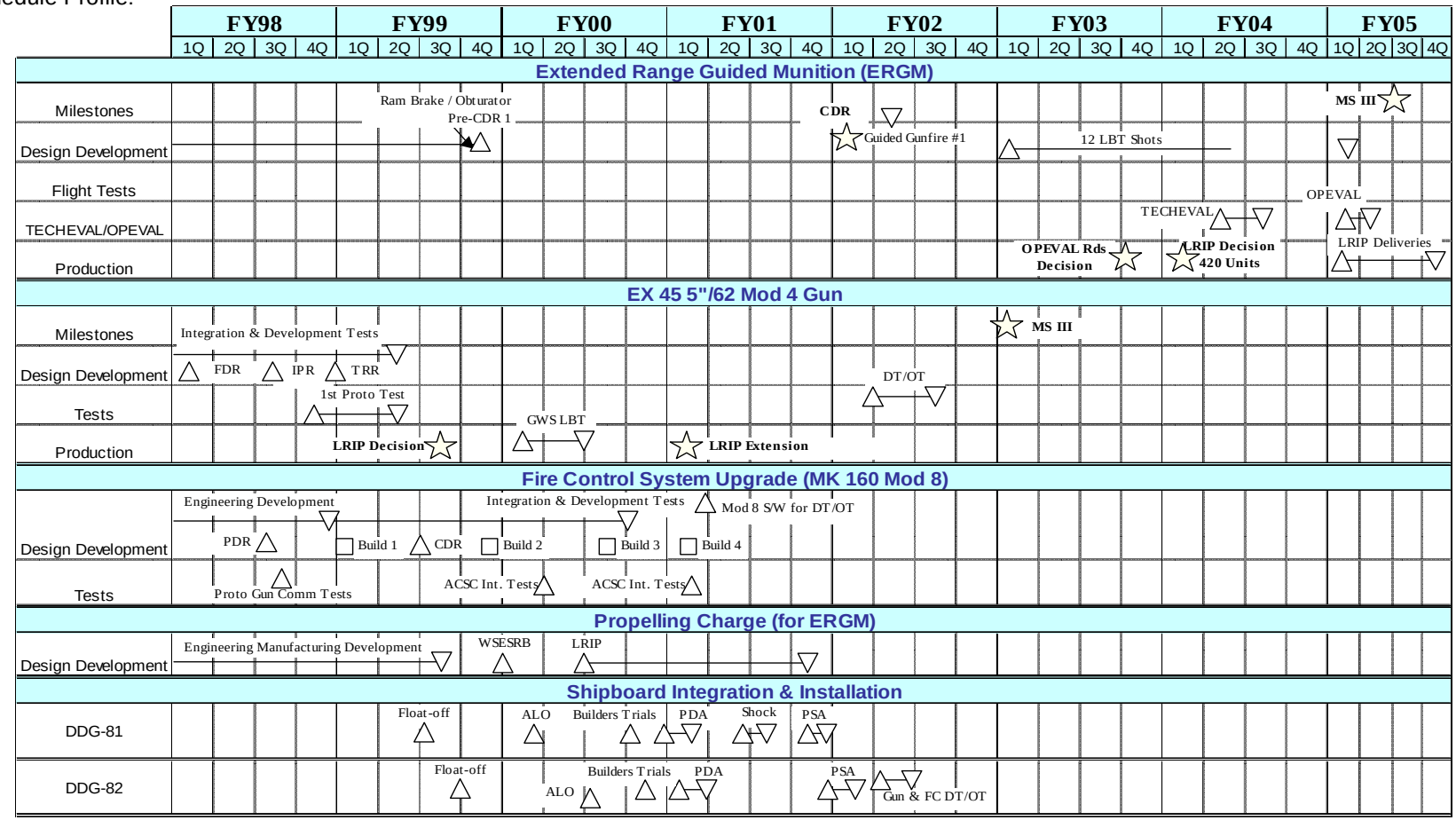

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Naval Surface Fire Support/32156/32624						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target of Contract
Privitization	CPIF/FF	UDLP, Minneapolis, MN	3.908									
Primary Hardware Development	CPIF/FF	UDLP, Minneapolis, MN	43.824	6.500	12/99	4.400	11/00	2.700	11/01	CONT	CONT	57.424
	CPAF/IF	Raytheon, Tucson, AZ	58.912	30.395	Various	26.000	11/00	19.815	11/01	CONT	CONT	146.800
	WR	NSWC Dahlgren, VA	56.867							CONT	CONT	N/A
	WR	NSWC Indian Head, MD	15.088							CONT	CONT	N/A
	WR	NSWC Port Hue., CA	25.386							CONT	CONT	N/A
LRIP	CPAF/IF	Raytheon, Tucson, AZ	0.000	0.000		0.000		0.000		CONT	CONT	7.500
ERGM BAA	VAR	Miscellaneous	0.000	3.961	Various	6.951	N/A	0.000	N/A	10.600	10.600	10.600
MEMS	VAR	Miscellaneous	1.500	0.500	Various	0.000	N/A	0.000	N/A	CONT	CONT	N/A
Systems Engineering	VAR	Miscellaneous	41.307	2.669	11/99	1.642	11/00	1.643	11/01	CONT	CONT	N/A
Award Fees	CPAF/IF	Raytheon, Tucson, AZ	1.123	0.000	Various	0.000	N/A	1.185	06/02	CONT	CONT	4.156
Subtotal Product Development			247.915	44.025		38.993		25.343		CONT	CONT	CONT
Remarks: The budget for each development contract is higher than the target value based on the program managers estimate of what will be needed to cover changes to requirements and cost growths. Program restructured in FY00.												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support	WR	NSWC		2.752	11/99	2.131	11/00	2.077	11/01	CONT	CONT	N/A
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	2.752		2.131		2.077		CONT	CONT	CONT

Exhibit R-3 Cost Analysis (page 2)												DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Naval Surface Fire Support/32156/32624						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC		8.654	11/99	8.474	11/00	7.170	11/01	CONT	CONT	N/A
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	8.654		8.474		7.170		CONT	CONT	N/A
Remarks:												
Contractor Engineering Support												
Government Engineering Support	WR	NSWC		5.392	11/99	4.304	11/00	3.435	11/01	CONT	CONT	N/A
Program Management Support	WR	Various		5.255	11/99	4.426	11/00	4.554	11/01	CONT	CONT	N/A
Travel	PD	NAVSEA HQ	0.523	0.105	Various	0.100	VAR	0.100	VAR	CONT	CONT	N/A
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.523	10.752		8.830		8.089		CONT	CONT	N/A
Remarks:												
Total Cost			248.438	66.183		58.428		42.679		CONT	CONT	CONT
Remarks:												

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification					DATE: **June 2001**					
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	**Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Advanced Land Attack Missile/32324					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**2.475**	**8.925**	**0.000**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: The Advanced Land Attack Missile (ALAM) and its associated weapons control system is intended to expand present interim capability provided by LASM in Aegis ships and to fully meet extended range requirements beyond present capability and service the land attack target set as derived from the OMFTS strategy. This capability shall be introduced into the DD21 Land Attack Destroyer to supplement its operational Mission Needs Statement. The ALAM will exploit upcoming technologies to service high threat mobile, stationary and hardened targets during all stages of conflict. It will be compatible with and integrated into future theater level command, control and other support weapons and systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($2.475) Performed two Warfare Analysis Laboratory Exercises (WALEX) at JHU/APL to determine operator (Navy and Marine Corps) requirements. FIRESIM simulation data and funding provided to support ALAM analysis. Completed the Broad Agency Announcement (BAA), analyzed the 17 white papers (industry concepts) and met with companies proposing system solutions. Completed Milestone 0 and authorized to proceed to Milestone I. Began work to complete Milestone I exit criteria documentation.

2. (U) FY 2001 PLAN:
- (U) ($8.787) Complete Analysis of Alternatives (AoA): Initiate concept development; Plan for Program Definition and Risk Reduction (PDRR); Accomplish Milestone I.
- (U) ($ .138) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN: N/A

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2000
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Advanced Land Attack Missile/32324	

D. (U) Schedule Profile:

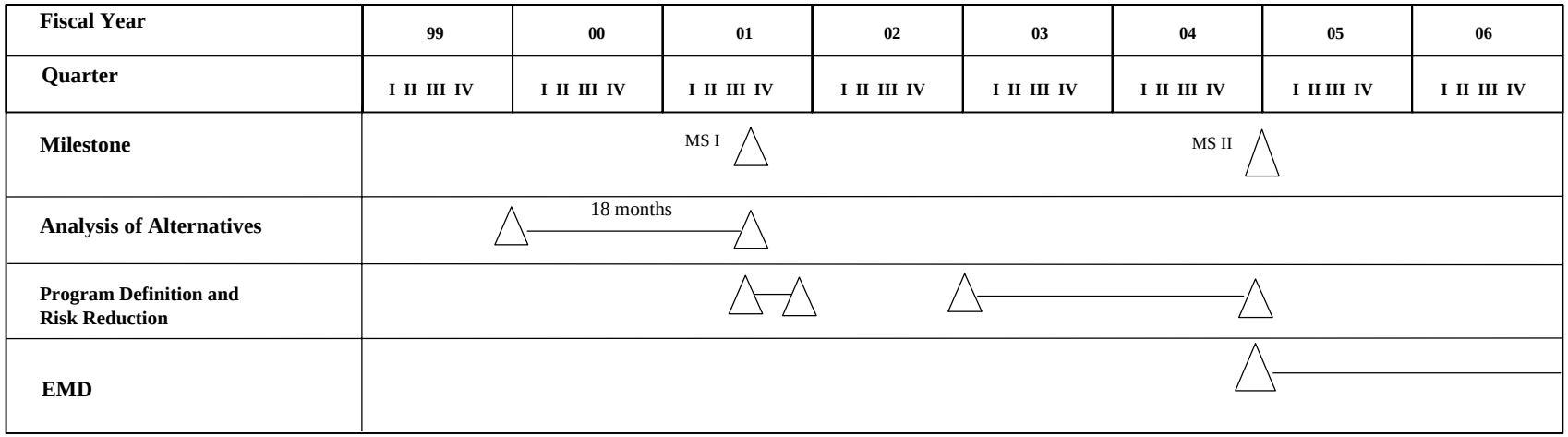

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4** | PROGRAM ELEMENT: **Land Attack Technology/0603795N** | PROJECT NAME AND NUMBER: Advanced Land Attack Missile/32324

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target of Contract
Primary Hardware Dev Phase I & II	C/CP	ALAM Industry Team				3.146	10/00 & 3/01					
Ancillary Hardware Development												
Systems Engineering	WR	NSWC, Dahlgren, VA	0.119	0.447		1.404	10/00			CONT	CONT	
	SS/CPFF	JHU/APL, Laurel, MD	0.126	1.214		1.500	10/00			CONT	CONT	
	WR	NAWC, China Lake, CA	0.000	0.000		1.404	10/00			CONT	CONT	
	WR	CNA, Alexandria, VA	0.090	0.513		0.000				CONT	CONT	
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.335	2.174		7.454		0.000		CONT	CONT	

Remarks:

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		CONT	CONT	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Advanced Land Attack Missile/32324						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		CONT	CONT	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	VAR	VARIOUS	0.166	0.301		1.471	11/00	0.000				
Travel	PD	NAVSEA HQ	0.000	0.000		0.000		0.000				
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.166	0.301		1.471		0.000		CONT	CONT	
Remarks:												
Total Cost			0.501	2.475		8.925		0.000		CONT	CONT	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Naval Fires Control System (NFCS) & Land Attack Fire Control Systems (LAM FCS)/32325						
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**24.599**	**48.575**	**48.835**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: Naval Fires Control System (NFCS) covers the mission planning and coordination for future Naval Surface Fire Support system requirements. NFCS will plan, coordinate and manage the firing of the new Naval Surface Fires Support (NSFS) weapon systems including the 5"/62 caliber gun, Conventional Munitions, and the Land Attack Missile (LAM) and LAM Fire Control. It will be available to amphibious ships, command ships, and the DD-21 program if selected by the full service contractor. The software will be integrated into Tactical TOMAHAWK Weapons Control Systems (TTWCS) in FY 2004, but will initially be hosted in the existing combat suite on DDG-81 for fleet introduction in FY 2002. Prototyping, demonstrations and developments will be conducted during FY 2000 and FY 2001.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($13.089) Software and system engineering to include analysis, development, reuse and integration of government and commercial computer programs to support ERGM, LAM and other naval weapon applications.
- (U) ($ 5.880) Support hardware configuration to support NFCS implementation. Support Developmental Testing (DT) Validation.
- (U) ($ 1.930) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development.
- (U) ($ 1.700) C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other developing C4I system and technology.
- (U) ($ 2.000) Developmental test and evaluation and logistic support elements development.

2. (U) FY 2001 PLAN:

- (U) ($15.750) Software and system engineering to include analysis, development, reuse and integration of government and commercial computer programs to support ERGM, LAM and other naval weapon applications.
- (U) ($ 6.198) Support hardware configuration to support NFCS implementation. Support DT Validation.
- (U) ($ 2.649) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development.
- (U) ($ 0.981) C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other developing C4I system and technology.
- (U) ($ 3.433) Developmental test & evaluation, and logistic support elements development.
- (U) ($ 5.494) LAM integration design, development and integration includes modification to Vertical Launch System.
- (U) ($10.693) LAM Fire Control system engineering and software development including interface development with NFCS, GPS and other weapon systems.
- (U) ($ 1.962) LAM Fire Control Program management and logistic support elements development.
- (U) ($ 0.500) LAM Fire Control Development Test and Evaluation.
- (U) ($ 0.915) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 6

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Naval Fires Control System (NFCS) & Land Attack Fire Control (LAM FCS)/32325

3. (U) FY 2002 PLAN:
- (U) ($16.584) Software and system engineering to include analysis, development, reuse and integration of government and commercial computer programs to support ERGM, LAM and other naval weapon applications.
- (U) ($ 3.651) Support hardware configuration to support NFCS implementation. Support DT Validation.
- (U) ($ 2.700) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development.
- (U) ($ 1.000) C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other developing C4I system and technology.
- (U) ($ 3.500) Developmental test & evaluation, and logistic support elements development.
- (U) ($ 6.200) LAM integration design, development and integration includes modification to Vertical Launch System.
- (U) ($12.200) LAM Fire Control system engineering and software development including interface development with NFCS, GPS and other weapon systems.
- (U) ($ 2.500) LAM Fire Control Program management and logistic support elements development.
- (U) ($ 0.500) LAM Fire Control development test and evaluation.

B. (U) Other Program Funding Summary:

	FY2000	FY2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
OPN BLI 511200				.600						CONT.

CONT.

C. (U) Acquisition Strategy: The acquisition strategy has been approved. A sole source contract has been awarded to GDIS for Phase 1. Phase 1+ will be embedded in TTWCS along with the LAM FCS. Phase 2 requirements will be either competed or an existing system development contract will be used.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Naval Fires Control System (NFCS) & Land Attack Fire Control (LAM FCS)/32325

D. (U) Schedule Profile:

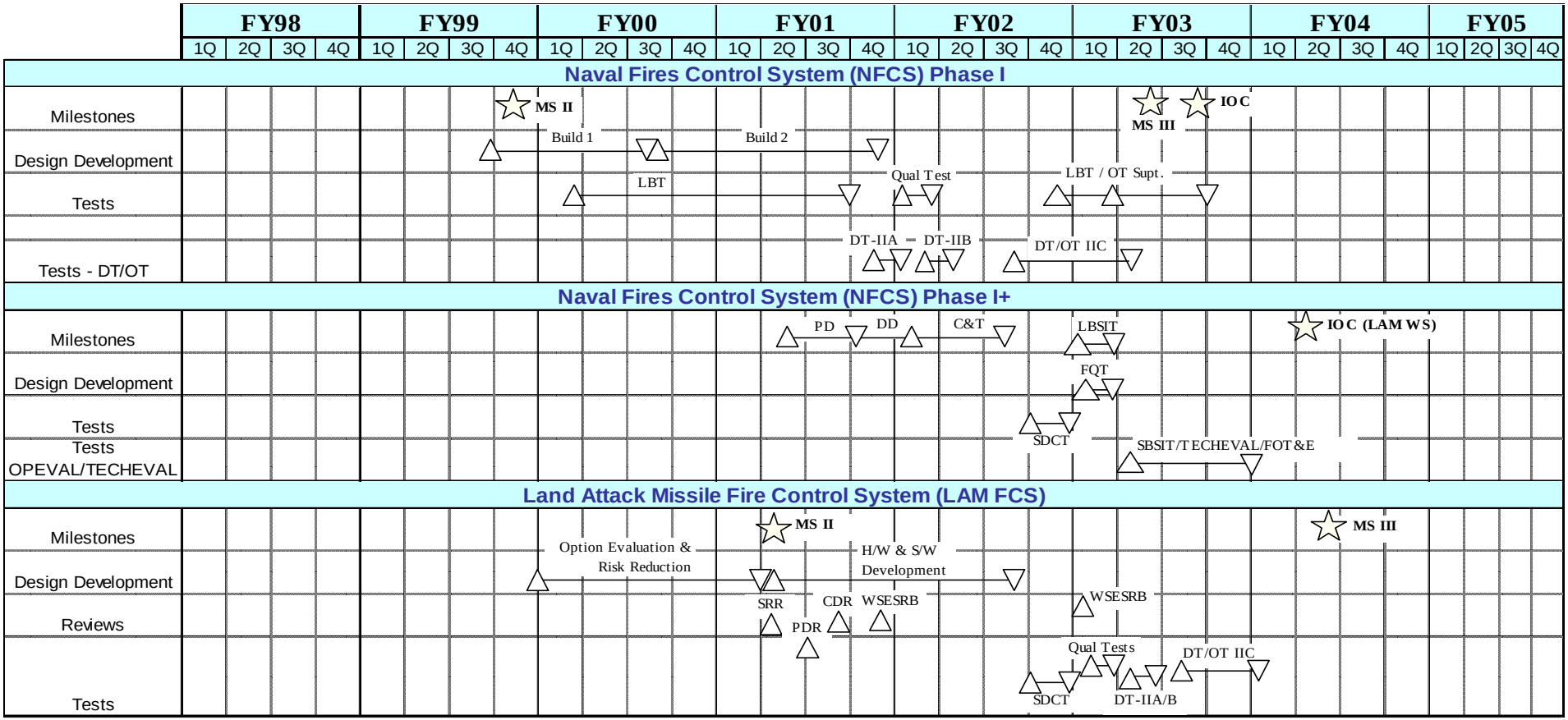

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Naval Fires Control System (NFCS) & Land Attack Fire Control Systems (LAM FCS)/32325						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Software Development	SS/CPAF	GDIS, Arlington, VA	6.904	8.473	11/99	12.533	11/00	12.960	11/01	CONT	CONT	TBD
	WR	NSWC, Dahlgren, VA	1.000	1.300	11/99	1.600	10/00	1.600	10/01	CONT	CONT	
	VAR	VARIOUS	0.919	0.700	02/00	0.400	11/00	0.400	11/01	CONT	CONT	
Systems Engineering	WR	SSC/SD	1.500	1.451	11/99	1.700	10/00	1.500	10/01	CONT	CONT	
	SS/CP	VITRO	0.300	0.300	11/99	0.300	11/00	0.300	11/01	CONT	CONT	
	VAR	VARIOUS	1.104	0.700	11/99	0.582	Various	0.582	Various	CONT	CONT	
Ancillary Harware Development	WR	NUWC, Keyport Division	1.000	5.100	11/99	4.484	10/00	2.517	10/01	CONT	CONT	
	WR	NSWC, Dahlgren, VA	1.000	1.100	11/99	1.200	10/00	1.200	10/01	CONT	CONT	
	VAR	VARIOUS	2.028	0.513	11/99	0.411	10/00	0.411	10/01	CONT	CONT	
Systems Engineering	WR	NSWC, Dahlgren, VA	1.339	1.562	11/99	1.200	10/00	1.200	10/01	CONT	CONT	
LAM FC Hardware/Software Dev	SS/CPFF	LM/Baltimore, MD	0.000	0.000		5.000	11/00	5.400	11/01	CONT	CONT	
	SS/CPAF	LM/MDS, Valley Forge, PA	0.000	0.000		9.500	11/00	10.600	11/01	CONT	CONT	
LAM FC Systems Engineering	SS/CPFF	JHU/APL	0.000	0.000		0.300	11/00	0.300	11/01	CONT	CONT	
	WR	NSWC, Dahlgren, VA	0.000	0.000		2.000	10/00	2.000	10/01	CONT	CONT	
Award Fees			0.396	1.300	TBD	3.265	TBD	3.265	TBD	CONT	CONT	
Subtotal Product Development			17.490	22.499		44.475	10/00	44.235	10/01	CONT	CONT	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support	VAR	VARIOUS	0.670	1.500	Various	2.500	Various	2.500	Various	CONT	CONT	
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.670	1.500		2.500		2.500		CONT	CONT	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Naval Fires Control System (NFCS) & Land Attack Fire Control Systems (LAM FCS)/32325						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC/PT HUE, CA	0.300	0.500	11/99	1.500	10/00	2.000	10/01	CONT	CONT	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.300	0.500		1.500		2.000		CONT	CONT	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel	PD	NAVSEA HQ	0.100	0.100	Various	0.100	Various	0.100	Various	CONT	CONT	
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.100	0.100		0.100		0.100		CONT	CONT	
Remarks:												
Total Cost			18.560	24.599		48.575		48.835		CONT	CONT	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Land Attack Standard Missile K2409					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**20.676**	**22.035**	**34.483**							
RDT&E Articles Qty	**8**	**5**	**9**							

A. (U) Mission Description and Budget Item Justification: This project funds the Land Attack Standard Missile (LASM) (SM-4) program to provide responsive, all-weather, around-the-clock Naval Surface Fire Support to Ground Combat Elements beyond that which is available from gun systems. Major efforts involved are systems integration and testing. Systems integration consists of integrating GPS/INS guidance, height of burst (HOB) sensor(s), warhead modifications, and new flight software to optimize effects against ground targets. Testing will include ground and flight tests to demonstrate safety, range, accuracy, jamming resistance, lethality, and reliability. RDT&E,N articles include inert operational missiles (IOMs) and a Dynamic Inert Missile (DIM) for ground testing and complete all up rounds (AURs) for flight testing.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($ 0.700) Developed programmatic documentation and made other preparations for Milestone II decision and awarded E&MD contract.
- (U) ($ 4.000) Completed PDRR. Continued to define missile system technical requirements; analyzed, tested, and selected GPS/INS, HOB sensor(s), warhead mods, and other component hardware and software; developed ITEP, SRD, TLR, PIPS, CIPS, ICDs, and other preliminary drawings.
- (U) ($12.426) Integrated hardware and software, developed preliminary missile design, and applied results of early testing to verify and/or refine preliminary design.
- (U) ($ 3.550) Initiated procurement of long-lead material and developed initial test and evaluation plan for hardware and software.

2. (U) FY 2001 PLAN:
- (U) ($16.825) Complete mechanical/electrical designs, software design, round-level integration, and critical design review; initiate ground tests and integration of missile with ship systems; complete fabrication and delivery of IOM, DIM, and hardware for flight testing at White Sands Missile range (WSMR).
- (U) ($1.000) Complete software validation and verification.
- (U) ($3.750) Develop 6-DOF modeling and simulation and computer-in-the-loop facility.

(U) ($0.460) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with USC 638.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Land Attack Standard Missile K2409	

3. (U) FY 2002 PLAN:
- (U) ($10.750) Initiate fabrication of at-sea flight rounds (TECHEVAL/OPEVAL).
- (U) ($15.233) Continue ground testing and conduct five flight engineering tests at WSMR, evaluate results, and finalize plans for developmental at-sea flight testing.
- (U) ($3.300) Validate 6-DOF modeling and simulation with validation and verification.
- (U) ($5.200) Complete section level and missile level environmental qualification.

B. (U) Other Program Funding Summary:

Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
O&MN 1D3D, 0701113N	0	0.003	0.072						CONT	CONT

C. (U) Acquisition Strategy: Pre E&MD efforts have been conducted under level of effort contracts with the SM-2 Design Agent (DA). A cost-plus E&MD completion contract was awarded to the DA to develop and integrate the necessary changes and to support DT/OT of LASM. Existing GFE SM-2 Block II/III missiles will be refurbished and converted into Land Attack Missiles (SM-4). Refurbishment and conversions are "turn key" and do not involve separate installations.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Land Attack Missile/K2409	

E. (U) Schedule Profile

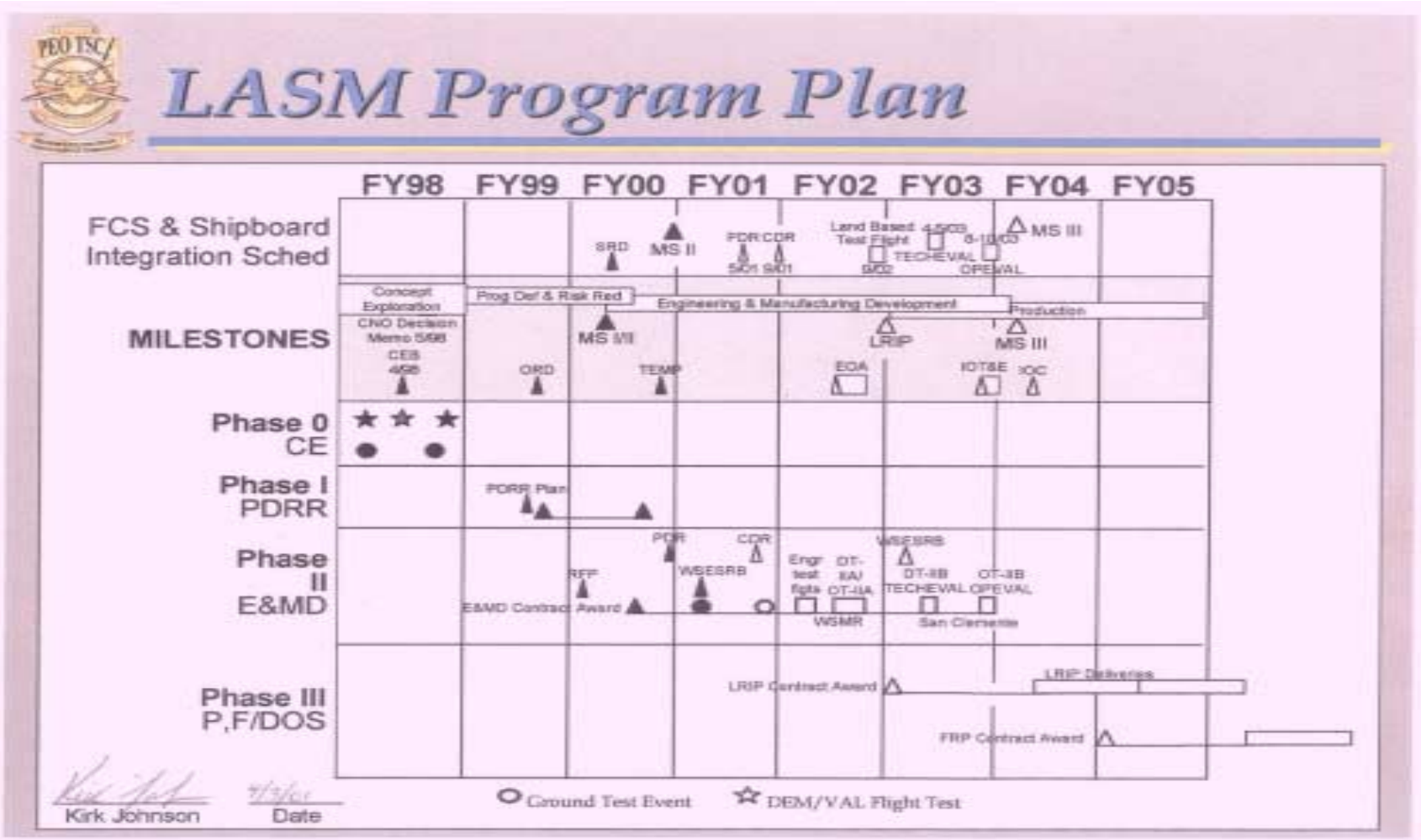

Exhibit R-3 Cost Analysis (page 1)							DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Land Attack Standard Missile K2409						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date		FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development													
Ancillary Hardware Development	WR	NSWC/Dahlgren, VA	1.225	1.600	12/99		2.750	10/00	1.600	10/01	2.208	9.383	
	WR	VAR	0.260	0.415	12/99		0.746	10/00	0.750	10/01	1.700	3.871	
Systems Engineering	WR	VAR	1.951	2.715	12/99		2.202	10/00	1.845	10/01	2.700	11.413	
	SS/CPAF	Raytheon Missile Systems, Tucson,	4.172	12.940	02/00		11.032	10/00	20.404	10/01	18.000	66.548	66.548
Award Fees			0.347	1.156	02/00		0.957	10/00	1.818	10/01	2.000	6.278	
Subtotal Product Development			7.955	18.826			17.687		26.417		26.608	97.493	
Remarks:													
Development Support Equipment													
Software Development													
Training Development													
Integrated Logistics Support	WR	VARIOUS	0.090	0.220	12/99		0.220	10/00	0.240	10/01	0.800	1.570	
Configuration Management	WR	VARIOUS	0.135	0.330	12/99		0.330	10/00	0.360	10/01	1.000	2.155	
Technical Data													
GFE													
Subtotal Support			0.225	0.550			0.550		0.600		1.800	3.725	
Remarks:													

Exhibit R-3 Cost Analysis (page 2)						DATE: **June 2001**						
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Land Attack Standard Missile K2409						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWC/WD, White Sands	0.700	0.250	12/99	0.500	10/00	3.600	10/01	0.100	5.150	
	WR	VAR	0.095	0.140	12/99	0.180	10/00	0.124	10/01	0.300	0.839	
Operational Test & Evaluation	WR	NAWC/AD, Pt Mugu,CA	0.050	0.150	12/99	0.350	10/00	0.450	10/01	3.000	4.000	
	WR	VAR	0.030	0.060	12/99	0.120	10/00	0.280	10/01	1.000	1.490	
Tooling												
GFE												
Subtotal T&E			0.875	0.600		1.150		4.454		4.400	11.479	
Contractor Engineering Support	VAR	VAR	0.425	0.550	12/99	2.196	10/00	2.547	10/01	2.900	8.618	
Government Engineering Support												
Program Management Support	VAR	VAR	0.613	0.100	12/99	0.392	10/00	0.400	10/01	0.800	2.305	
Travel	PD	NAVSEA HQ	0.025	0.050	VAR	0.060	VAR	0.065	VAR	0.300	0.500	
Labor (Research Personnel)												
Overhead												
Subtotal Management			1.063	0.700		2.648		3.012		4.000	11.423	
Remarks:												
Total Cost			10.118	20.676		22.035		34.483		36.808	124.120	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Continuous Processor K2771					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**5.867**	**0.000**	**0.000**							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: Development of technology to manufacture propellants and explosives using continuous processing methods will result in lower costs for the energetic materials used in Naval Guns. Prior investments in this technology have established the fundamental science and engineering supporting the feasibility of this process to significantly reduce the cost to produce energetics, to reduce waste and pollution during manufacturing, improve the safety of operations and to improve product quality and reproducibility. The efforts under this project was directed towards scale-up of the continuous processing technology, demonstration of the benefits, and the technology transition to industry for the manufacture of gun propellants and other energetics.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS AND PLANS:
   - (U) ($5.867) Initiated process definition and design for a flexible capability to scale-up continuous processing technology. This included hazards and environmental analyses, design and acquisition of specific process equipment needed to demonstrate gun propellant manufacture, and processing technology development and support.

2. (U) FY 2001 PLAN: N/A

3. (U) FY 2002 PLAN: N/A

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Continuous Processor K2771	

B. (U) Other Program Funding Summary: Not Applicable

C. (U) Acquisition Strategy: Not Applicable

D. (U) Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Continuous Processor K2771						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 001 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Technology Development	WR	NSWC IHDIV	0.000	3.040	N/A	0.000	N/A	0.000	N/A	0.000	3.040	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Process equipment/tooling	C/FP	Various/TBD	0.000	2.827	N/A	0.000	Various	0.000	N/A		2.827	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			0.000	5.867		0.000		0.000		0.000	5.867	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Categories do not apply												

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Continuous Processor K2771						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: This is a non-ACAT program and a FY00 Congressional plus-up. DT and OT testing of energetics manufactured by this process will be conducted when those products are incorporated into a weapon systems development or product improvement program.												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.000	5.867		0.000		0.000		0.000	5.867	
Remarks:												

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification					DATE: **June 2001**					
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	**Land Attack Technology/0603795N**				PROJECT NAME AND NUMBER Naval Fires Network/32927					
COST ($ in Millions)	FY 2000*	FY 2001**	FY 2002							
Project Cost	9.500	0.993	4.996							
RDT&E Articles Qty										

* FY 2000 Omnibus ATR for Naval Fires Network Project K2927 $9.5M
** FY 2001 Congressional add for Naval Fires Network Project 32927 $.993M

A. (U) Mission Description and Budget Item Justification: These funds provide for the Naval Fires Network (NFN) to develop a system which will automate, coordinate, and correlate, in a real time fashion, the processing of multiple tactical data streams from various surveillance/intelligencesources to provide time-critical fire control solutions for advanced weapon systems and sensors. The automation/correlation provided by NFN will provide the Navy an ability to quickly target and re-target precision weapons, greatly enhancing their effectiveness and lethality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($6.810) Development of Coronado Build System.
- (U) ($1.120) Program management support.
- (U) ($1.000) Modified System Government Furnished Equipment.
- (U) ($ .400) Coronado Build System training.
- (U) ($ .170) Installation of System on the Coronado.

2. (U) FY 2001 PLAN:
- (U) ($ .993) Support of Limited Objective Experiment (LOE) and Fleet Battle Experiment India (FBE "I").
- (U) ($. 000) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
- (U) ($ .947) Development of hardware for NFN.
- (U) ($2.299) Development of software for NFN.
- (U) ($ .350) Testing of on-board and land-based facilities.
- (U) ($ .300) Development of Tactical Dissemination Module (TDM).
- (U) ($ .200) Acquisition Planning.
- (U) ($ .900) Program management support.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Naval Fires Network/32927	

B. (U) Other Program Funding Summary: N/A

(U) Related RDT&E,N: PE0204152N, FY 2001 $5.765M

C. (U) Acquisition Strategy: The Naval Fires Network (NFN) program will utilize contracting vehicles already in place for the existing Army Tactical Exploitation System (TES) program. The Navy plan is to adapt Army TES for use in NFN support of Navy Network Centric Warfare Time Critical Targeting.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Land Attack Technology/0603795N**	PROJECT NAME AND NUMBER Naval Fires Network/32927

E. (U) Schedule Profile

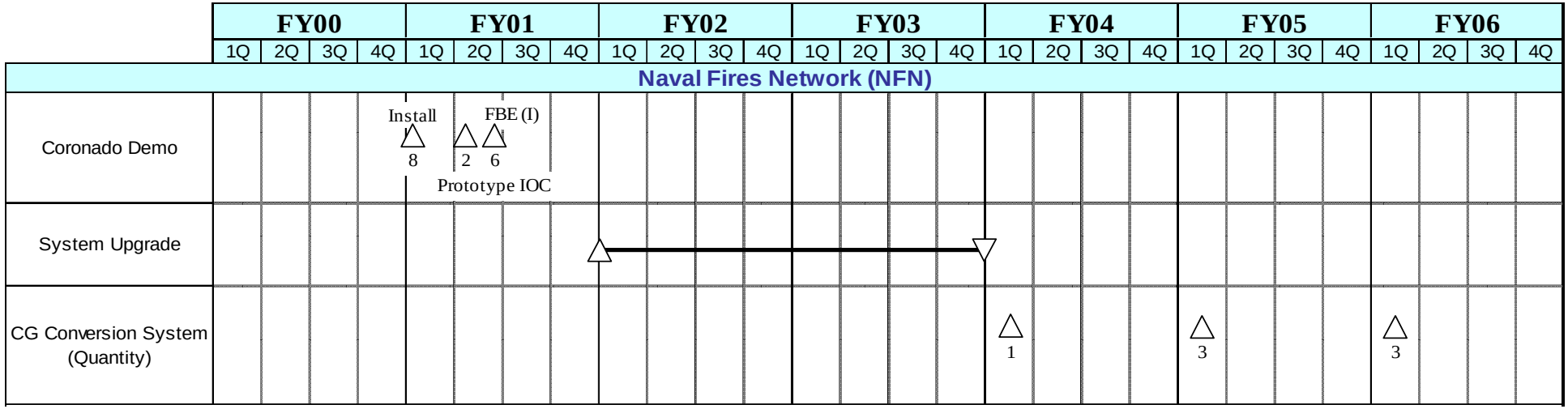

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Naval Fires Network/32927						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target of Contract
System Build	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	6.810	09/00	0.000	N/A	0.000	N/A	CONT	CONT	N/A
Modify System GFE	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	1.000	09/00	0.000	N/A	0.000	N/A	CONT	CONT	1.000
Training	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	0.400	09/00	0.000	N/A	0.000	N/A	CONT	CONT	0.400
Installation	WR	NSWC PHD, San Diego, CA	0.000	0.170	09/00	0.000	N/A	0.000	N/A	CONT	CONT	0.300
LOE/FBE "I"	CPFF/IF/AF	VARIOUS	0.000	0.000	N/A	0.300	11/00	0.000	N/A	CONT	CONT	0.300
	WR	VARIOUS	0.000	0.000	N/A	0.693	11/00	0.000	N/A	CONT	CONT	N/A
Primary Hardware Development	CPFF/IF/AF	VARIOUS	0.000	0.000	N/A	0.000	N/A	0.830	11/01	CONT	CONT	2.100
	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	0.000	N/A	0.000	N/A	0.117	11/01	CONT	CONT	N/A
Primary Software Development	CPFF/IF/AF	VARIOUS	0.000	0.000	N/A	0.000	N/A	2.040	11/01	CONT	CONT	2.100
	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	0.000	N/A	0.000	N/A	0.259	11/01	CONT	CONT	N/A
Testing	CPFF/IF/AF	VARIOUS	0.000	0.000	N/A	0.000	N/A	0.310	11/01	CONT	CONT	2.100
	WR/MIPR	SAF/FMB/OLE (Air Force)	0.000	0.000	N/A	0.000	N/A	0.040	11/01	CONT	CONT	N/A
TDM	WR	NAWC China Lake	0.000	0.000	N/A	0.000	N/A	0.300	11/01	CONT	CONT	N/A
P3I	WR	NSWC Dahlgren, VA	0.000	0.000	N/A	0.000	N/A	0.200	11/01	CONT	CONT	N/A
Subtotal Product Development			0.000	8.380		0.993		4.096		CONT	CONT	CONT
Remarks:												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Land Attack Technology/0603795N**			PROJECT NAME AND NUMBER Naval Fires Network/32927				
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Target Value of Contract
Developmental Test & Evaluation										
Operational Test & Evaluation										
Tooling										
GFE										
Subtotal T&E			0.000	0.000		0.000		0.000		
Remarks:										
Contractor Engineering Support										
Government Engineering Support										
Program Management Support	VAR	VARIOUS	0.000	1.020	09/00	0.000	N/A	0.800	10/01	N/A
Travel	PD	NAVSEA HQ	0.000	0.100	09/00	0.000	N/A	0.100	VAR	N/A
Labor (Research Personnel)										
Overhead										
Subtotal Management			0.000	1.120		0.000		0.900		
Remarks:										
Total Cost			0.000	9.500		0.993		4.996		CONT
Remarks:										

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET **DATE: June 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603800N**
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) COST (Dollars in Millions)

PROJECT NUMBER / TITLE / PROGRAM	PRIOR YEAR COST	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	COST TO COMPLETE	TOTAL PROGRAM
D2209 JSF	1,371.033	238.420	341.164	0	0	0	0	0	0	0	1,950.617

Quantity of RDT&E Articles 4

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike fighter aircraft for the USN, USMC, USAF and allies. The current phase emphasizes facilitating the evolution of fully validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (EMD) in Fall 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program. The United Kingdom is a collaborative partner in this phase of the program and several other countries also participate.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it integrates hardware for test related to specific ship or aircraft applications.

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET **DATE: June 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603800N**
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) COST (Dollars in Millions)

PROJECT NUMBER / TITLE	PRIOR YEAR COST	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	COST TO COMPLETE	TOTAL PROGRAM
PROGRAM D2209 JSF	1,371.033	238.420	341.164	0	0	0	0	0	0	0	1,950.617

Quantity of RDT&E Articles 4

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike fighter aircraft for the USN, USMC, USAF and allies. The current phase emphasizes facilitating the evolution of fully validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (EMD) in Fall 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program. The United Kingdom is a collaborative partner in this phase of the program and several other countries also participate.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS: (Breakout reflects Navy, Air Force, United Kingdom, Multi-Lateral and Canadian funding)

- (U) ($393.548) Continued Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation and concept refinement for a tri-service family of aircraft.

- (U) ($ 34.711) Continued development of a second engine (GE F-120 engine) for competition in production.

- (U) ($ 56.462) Completed technology maturation demonstrations and continued assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion and mission systems. Continued systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.

• (U) ($ 9.002) Continued technology maturation demonstrations and assessments in the area of autonomic logistics and completed prognostics and health management technology maturation demonstrations and assessments.

• (U) ($ 11.377) Continued modeling and simulation activities to support strike warfare mission area analysis and requirements analysis efforts including COPT to facilitate the Services' joint requirements definition. Completed the Operational Requirements Document (ORD). Continued modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).

• (U) ($ 16.909) Continued mission support, including program office functions.

• (U) ($522.009) Total

2. (U) FY 2001 PLAN: (Breakout reflects Navy, Air Force, United Kingdom and Multi-Lateral funding)

• (U) ($368.713) Complete Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation and concept refinement for a tri-service family of aircraft. Request proposals from contractors for their designs and E&MD programs.

• (U) ($ 172.000) Complete transition risk reduction activities under bridge contracts with Boeing, Lockheed Martin and Pratt & Whitney, and fund Pratt & Whitney long-lead requirements to protect EMD schedule; this is a Not-To-Exceed estimate.

• (U) ($ 45.620) Complete the GE JSF F-120 Engine Phase IIIA effort (Common Core Design Trade Studies) in this Program Element. (GE F-120 Engine Development Program will continue in JSF E&MD, Program Elements 0604800N and 0604800F.)

• (U) ($ 50.866) Complete assessments/system engineering support for the Concept Demonstration Phase in the areas of airframe, flight systems, manufacturing and producibility, mission systems, propulsion, autonomic logistics, system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability. Complete analyses required for Milestone II. Conduct source selection evaluation to support down-select for final design.

• (U) ($ 26.117) Complete modeling and simulation activities to support required Milestone II analyses. Complete modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET **DATE: June 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603800N**
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

- (U) ($ 21.515) Complete mission support, including program office functions.
- (U) ($684.831) Total

3. (U) FY 2002 PLAN: Not Applicable

(U) B. PROGRAM CHANGE SUMMARY: (Dollars in Millions)

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	$239.907	$131.566	$ 0
(U) Adjustments from President's Budget:	-1.487	+209.598	
(U) FY 2002 President's Budget Submit:	$238.420	$341.164	$ 0

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 decrease of $1.487 million is due to a decrease of $.534 million for a small business innovative research assessment, a decrease of $.013 million for federal technology transfer and a decrease of $.940 million for a Congressional recission. The FY 2001 net increase of $209.598 million is due to a Congressional increase of $111.484 million for a projected schedule delay, a Congressional reprogramming increase of $100.344 million from PE 0604800N and a Congressional general reduction decrease of $2.230 million.

(U) Schedule: Experienced delays in contractor flight test schedules, extending completion of this phase until Fall 2001.

(U) Technical: Not applicable.

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET **DATE: June 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603800N**
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) C. OTHER PROGRAM FUNDING SUMMARY: (Dollars in Millions) This is a joint program with no executive service. The United Kingdom is a collaborative partner in this phase of the program and several other countries also participate.

Appn	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	TO COMPLETE	TOTAL COST
(U) RDT&E 0603800F	$249.088	$341.167	0	0	0	0	0	0	0	$1,907.352
(U) RDT&E 0603800E	0	0	0	0	0	0	0	0	0	$118.006
(U) UNITED KINGDOM	$26.101	$.800	0	0	0	0	0	0	0	$201.091
(U) MULTI-LATERAL	$5.100	$1.700	0	0	0	0	0	0	0	$32.100
(U) CANADA	$3.300	0	0	0	0	0	0	0	0	$10.600
(U) ITALY	0	0	0	0	0	0	0	0	0	$10.000

(U) RELATED RDT&E: (Dollars in Millions)

Milestone II for EMD of the Joint Strike Fighter (JSF) is planned in Fall 2001.

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	TO COMPLETE	TOTAL COST
(U) RDT&E 0604800N	0	0	$767.238	TBD	TBD	TBD	TBD	TBD	TBD	TBD
(U) RDT&E 0604800F	0	0	$769.511	TBD	TBD	TBD	TBD	TBD	TBD	TBD
(U) UNITED KINGDOM	0	0	$95.000	TBD	TBD	TBD	TBD	TBD	TBD	TBD

(U) RELATED PROCUREMENT FUNDING: TBD

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) D. ACQUISITION STRATEGY:

Program activities in this phase center around three distinct objectives that provide a sound foundation for the start of Engineering and Manufacturing Development (EMD) in Fall 2001:

(1) facilitating the Services' development of fully validated, affordable operational requirements;
(2) lowering risk by investing in and demonstrating key leveraging technologies that lower the cost of development, production and ownership; and
(3) demonstrating operational concepts.

Early warfighter and technologist interaction was an essential aspect of the requirements definition process, and key to achieving JSF affordability goals. To an unprecedented degree the JSF Program used cost-performance trades early, as an integral part of the weapon system development process. The Services defined requirements through an iterative process, balancing weapon system capability against life cycle cost at every stage. Each iteration of requirements was provided to industry. They evolved their designs and provided cost data back to the warfighters. The warfighters evaluated trades and made decisions for the next iteration. This iterative process produced iterations of the Services' Joint Interim Requirements Documents in 1995, 1997, 1998 and culminated in the approved joint Operational Requirements Document (ORD) in FY 2000.

A sizable technology maturation effort was conducted to reduce risk and life cycle cost (LCC) through technology maturation and demonstrations. The primary emphasis was on technologies identified as high payoff contributors to affordability, supportability, survivability and lethality. Numerous demonstrations were accomplished to validate performance and life cycle cost impact to component, subsystem, and the total system.

In November 1996 contracts were competitively awarded to Boeing and Lockheed Martin for Concept Demonstration Programs. These competing contractors built and are flying concept demonstrator aircraft, conducted concept unique ground demonstrators, and refined their respective weapon system concepts. Specifically, Boeing and Lockheed Martin are demonstrating commonality and modularity, STOVL hover and transition, and low speed handling qualities of their respective weapon system concepts. Pratt and Whitney is providing propulsion hardware and engineering support. The JSF Concept Demonstration approach has several benefits:

(1) maintains the competitive environment prior to EMD and provides for two different STOVL approaches and two different aerodynamic configurations
(2) demonstrates the viability of a multi-service family of variants with high commonality and modularity between CTOL, CV, and STOVL variants
(3) provides affordable and low risk technology transition to the JSF EMD phase.

The JSF F-120 Engine Program, with General Electric, continues the development of a second, interchangeable, engine for competition in production.

Downselect to a single prime weapon system contractor for EMD and Milestone II is planned in Fall 2001.

EXHIBIT R-2, FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET **DATE: June 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603800N**
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) E. SCHEDULE PROFILE:

Dec 94 Commenced Concept Development Phase
Mar 96 Released RFP for Concept Demonstration Efforts
May 96 Designated a joint, DOD, Acquisition Category ID Program by USD(A&T)
Nov 96 Competitively Awarded Concept Demonstration Contracts to Boeing and Lockheed Martin
Mar 00 Services Completed Joint Operational Requirements Document (ORD)
Fall 01 Milestone II and EMD Contract Award

BUDGET ACTIVITY: 4	PROGRAM ELEMENT:	0603800N	USN	PROJECT NUMBER:	D2209
BUDGET ACTIVITY: 4	PROGRAM ELEMENT:	0603800F	USAF	PROJECT NUMBER:	2025
BUDGET ACTIVITY: 3	PROGRAM ELEMENT:	0603800E	DARPA	PROJECT NUMBER:	JA-01
BUDGET ACTIVITY: NA	PROGRAM ELEMENT:	N/A	UNITED KINGDOM	PROJECT NUMBER:	UK
BUDGET ACTIVITY: NA	PROGRAM ELEMENT:	N/A	MULTI-LATERAL	PROJECT NUMBER:	ML
BUDGET ACTIVITY: NA	PROGRAM ELEMENT:	N/A	CANADA	PROJECT NUMBER:	CAN
BUDGET ACTIVITY: NA	PROGRAM ELEMENT:	N/A	ITALY	PROJECT NUMBER:	ITALY
	PROGRAM ELEMENT TITLE:	JOINT STRIKE FIGHTER (JSF)		PROJECT TITLE:	JSF

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING ($ in Millions) No budget in FY 1993 and Prior.

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	Cost To Complete	Total Cost	Target Value of Contract
PROJECT DEVELOPMENT										
Strike Warfare Concept Studies (Total Prior to FY 2002)										
	Various	Miscellaneous	11.467						11.467	
Technology Maturation Concept Exploration Phase (Total Prior to FY 2002)										
	Various	Fld. Activ.	3.432						3.432	
Strike Warfare Systems Design Development (Total Prior to FY 2002)										
	C/CPFF	Boeing Seattle WA	32.770						32.770	
	C/CPFF	McAir St. Louis MO	23.708						23.708	
	C/CPFF	Northrop Pico Rivera CA	21.358						21.358	
	C/CPFF	Lockheed Fort Worth TX	28.311						28.311	
	Various	Miscellaneous	1.121						1.121	
	Various	Fld. Activ.	8.322						8.322	
SUBTOTAL			115.590						115.590	
ASTOVL (Total Prior to FY 2002)										
	SS/CPFF	Lockheed	16.416						16.416	
	SS/CPFF	Boeing	11.200						11.200	
	Various	Miscellaneous	15.539						15.539	
SUBTOTAL			43.155						43.155	
Core Team Support (Total Prior to FY 2002)										
	Various	Fld. Activ.	2.522						2.522	

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Weapon System Concept Demonstrations (including flying demonstrators and supporting propulsion efforts)										
	C/CPFF	Boeing *	718.029	79.169	Oct 00				797.198	797.198
	C/CPFF	Lockheed *	783.004	161.850	Oct 00				944.854	944.854
	SS/CPFF	Pratt & Whitney * Hartford CT	837.090	127.694	Oct 00				964.784	964.784
SUBTOTAL			2,338.123	368.713					2,706.836	
Transition Risk Reduction Activities										
	SS/FFP	Boeing		43.333	Apr 01				43.333	43.333
	SS/FFP	Lockheed Martin		43.333	Apr 01				43.333	43.333
	SS/CPFF	Pratt & Whitney		85.334	Apr 01				85.334	85.334
SUBTOTAL				172.000					172.000	172.000
F-120 Engine Program										
	SS/CPFF	GE Cincinnati OH	7.000						7.000	
	SS/CPFF	GE	138.107	45.620	Oct 00				183.727	186.727
SUBTOTAL			145.107	45.620					190.727	
Airframe										
	SS/CPFF	McAir	19.240						19.240	
	Various	Miscellaneous	2.135	.023	Various				2.158	
	Various	Fld. Activ.	6.777	1.141	Nov 00				7.918	
SUBTOTAL			28.152	1.164					29.316	

*includes government managed equipment

Note: Consistent with Boeing and Lockheed Martin replans, annual funding increments reflect budgeted basic Concept Demonstration Program (CDP) efforts as well as areas of technology maturation. Boeing and Lockheed Martin Target Value of Contract reflects total contract funding requirements.

Pratt and Whitney Total Value of Contract reflects award fees totaling $35.1M, FY 1998 and prior, basic CDP efforts and technology maturation efforts in Propulsion and Prognostics and Health Management.

Award Fees (included in Pratt & Whitney Contract)

Note: The Risk Reduction Contracts Total Costs and Target Values are Not-to-Excced Estimates. The Pratt & Whitney Contract includes Long Lead Materials.

Note: The Target Value includes Propulsion Technology Maturation efforts.

Technology Maturation

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Flight Systems										
	C/CPFF	Lockheed	52.201						52.201	
	C/CPFF	McAir	65.944						65.944	
	Various	Miscellaneous	10.141	.178	Various				10.319	
	Various	Fld. Activ.	20.982	2.091	Nov 00				23.073	
SUBTOTAL			149.268	2.269					151.537	
Manufacturing and Producibility										
	C/CPFF	Hughes Los Angeles CA	5.065						5.065	
	C/CPFF	Lockheed	9.600						9.600	
	C/CPFF	General Res. Corp. Huntsville AL	1.945						1.945	
	C/CPFF	Scaled Composites	2.000						2.000	
	C/CPFF	Lockheed	.700						.700	
	Various	Miscellaneous	1.619						1.619	
	Various	Fld. Activ.	5.148	.242	Nov 00				5.390	
SUBTOTAL			26.077	.242					26.319	
Propulsion										
	C/CPFF	Pratt/Whitney	5.448						5.448	
	SS/CPFF	GE	5.681						5.681	
	SS/CPFF	Pratt/Whitney	30.000						30.000	
	SS/CPFF	GE	3.000						3.000	
	SS/CPFF	Pratt/Whitney	26.777						26.777	
	SS/CPFF	Pratt & Whitney	3.640						3.640	
	SS/TBD	Pratt & Whitney	8.200						8.200	
	NASA Contract		2.800						2.800	
	Various	Miscellaneous	14.795	.050	Various				14.845	
	Various	Fld. Activ.	47.893	2.990	Nov 00				50.883	
SUBTOTAL			148.234	3.040					151.274	

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Mission Systems										
	C/CPFF	TI Plano TX	2.464						2.464	
	SS/CPFF	Lockheed	6.856						6.856	
	SS/CPFF	McAir	6.524						6.524	
	C/CPFF	Raytheon	45.173						45.173	
	C/CPFF	Northrop/Grumman	41.903						41.903	
	C/CPFF	Boeing	1.575						1.575	
	C/CPFF	Lockheed	1.517						1.517	
	C/CPFF	Hughes	3.681						3.681	
	Classified	Classified	3.000						3.000	
	Various	Miscellaneous	24.856	.221	Various				25.077	
	Various	Fld. Activ.	33.587	5.135	Nov 00				38.722	
SUBTOTAL			171.136	5.356					176.492	
Systems Engineering Support										
	Various	Miscellaneous	24.642	5.626	Various				30.268	
	Various	Fld. Activ.	114.195	22.105	Nov 00				136.300	
SUBTOTAL			138.837	27.731					166.568	
Autonomic Logistics										
	C/CPFF	Pratt & Whitney	10.100						10.100	
	C/CPFF	General Electric	1.500						1.500	
	C/CPFF	Classified								
	C/CPFF	Project 3	8.576						8.576	
	C/CPFF	Project 4	5.549						5.549	
	Various	Miscellaneous	9.584	2.571	Various				12.155	
		Fld. Activ.	15.677	6.244	Nov 00				21.921	
SUBTOTAL			50.986	8.815					59.801	
Modeling, Simulation, Analysis, Threat, COPT and Core Support										
	Various	Miscellaneous	47.737	12.526	Various				60.263	
	Various	Fld. Activ.	32.874	13.191	Nov 00				46.065	
SUBTOTAL			80.611	25.717					106.328	

EXHIBIT R-3, FY 2002 RDT&E,N COST ANALYSIS DATE: June 2001

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PY's Cost	FY 2001 Cost	FY 2001 Award Date	FY 2002 Cost	FY 2002 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Mission Support										
	Grant	Institute for Defense Anal	2.500						2.500	
	Various	Fld. Activ.	32.869	6.691	Various				39.560	
SUBTOTAL			35.369	6.691					42.060	
Subtotal Project Development			3,488.066	667.358					4,155.424	
SUPPORT (CS)										
	SS/CPFF	ANSER Arlington VA	28.981	1.144	Jan 01				30.125	
	C/CPFF	SVERDRUP/ANTEON Arlington, VA		2.618	Apr 01				2.618	
	SS/CPFF	Stanley Assoc. Arlington, VA		4.945	Apr 01				4.945	
	C/CPFF	AEGIS Arlington, VA		1.058	Apr 01				1.058	
	Various	Miscellaneous	27.888	7.708	Various				35.596	
Subtotal Support			56.869	17.473					74.342	
TEST AND EVALUATION: (included above)										
MANAGEMENT: N/A										
Total Cost			3,544.935	684.831					4,229.766	
Funding Resources										
0603800N			1,609.453	341.164					1,950.617	
0603800F			1,566.185	341.167					1,907.352	
0603800E			118.006	0					118.006	
United Kingdom			200.291	0.800					201.091	
Multi-Lateral			30.400	1.700					32.100	
Canada			10.600	0					10.600	
Italy			10.000	0					10.000	
Total			3,544.935	684.831					4,229.766	

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603851M Non-Lethal Warfare DEM/VAL**				PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**25.827**	**29.309**	**34.008**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont**	**Cont**
RDT&E Articles Qty										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project covers non-lethal weapon (NLW) systems which are those systems that by their design, do not inflict fatal or permanent injuries. Instead, these systems are designed to stun, incapacitate, or hinder movement of individuals, crowds, or equipment. The availability of NLWs allows commanders less than lethal options, particularly in urban warfare and military operations other than war, i.e., peacekeeping, humanitarian assistance and disaster relief, as well as special operations.

PROGRAM ACCOMPLISHMENTS AND PLANS

FY 2000 Accomplishments:

- (U) $ 1.023 Execution oversight and administration of the Joint NLW Program and technologies database expansion.
- (U) $ 0.936 Evaluation of NLWs by Service warfighting laboratories for direct user feedback on various NL technologies and munitions.
- (U) $ 0.705 Continued development of a modeling and simulation analysis tool for NLWs such as the Joint Conflict and Tactical Simulation (JCATS) model and performance effects data collection.
- (U) $ 1.215 Continued pursuit of new technology through open competition of industry, academia and government lab sources for NL capabilities.
- (U) $ 0.918 NL Crowd Dispersal Cartridge – Engineering & Manufacturing Development of a NL round of munitions for the M203 40mm Grenade Launcher.
- (U) $ 3.000 Established a technology innovation initiative to allow pursuit of new NL materials and technologies.
- (U) $ 0.883 Ground Vehicle Stopper (GVS) – Continued evaluation of several proposed vehicle stopper technologies that have potential to stop/slow ground vehicles.
- (U) $ 0.693 Vessel Stopper System (VSS) – Continued evaluation of NL means of stopping maritime vessels and small, fast moving boats.
- (U) $ 4.328 Active Denial Technology (ADT) – Continued evaluation, testing and target assessment of a HMMWV mounted directed energy system.
- (U) $ 2.320 66mm NL Munitions – Completed testing of the 66mm vehicle launched munitions for crowd control and site security missions.
- (U) $ 0.533 Bounding NL Munitions – Continued development of NL bounding munitions to serve as an area denial/perimeter defense system.
- (U) $ 1.670 Canister Launched Area Denial System (CLADS) – Continued development of NL munitions launched from a multi-platform mounted mine dispenser.
- (U) $ 1.020 Foams – Continued evaluation and testing of both rigid and slippery foams and packaging delivery platforms.
- (U) $ 1.076 Studies and Analysis – Medical and NL casualty data collection; strategic planning; human effects assessments; and technical studies/analysis of emerging technologies for possible NL application.
- (U) $ 2.050 Concept Exploration Program (CEP) – Continued to explore and develop technical NL solutions to clear facilities and area denial for personnel.
- (U) $ 0.054 Joint Integration Project (JIP) – Continued to select and test commercial products that will meet the Joint Services' requirement for specific NL capability sets items.
- (U) $ 2.022 Developed and evaluated new RDT&E NLW technology initiatives.
- (U) $ 0.796 Modular Crowd Control Munitions (MCCM) – Completed evaluation and testing of a vehicle-mounting bracket for MCCM on vehicles.
- (U) $ 0.585 Running Gear Entanglement System (RGES) – Continued development of a NL entanglement capability to stop small, fast moving boats.

(U) Total $ 25.827

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603851M Non-Lethal Warfare DEM/VAL**	PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**

FY 2001 Planned Program

- (U) $ 1.379 Execution oversight, administration and support of the Joint NLW Program and technologies database.
- (U) $ 2.096 Evaluation of NLWs by Service warfighting laboratories and Joint Forces Command (JFCOM) for direct user feedback of various NL technologies and munitions.
- (U) $ 0.891 Initial modeling and simulation validation and verification of NLW in the Joint Conflict and Tactical Simulation (JCATS) model and performance effects data collection.
- (U) $ 1.080 Continue pursuit of new technology through open competition of industry, academia and government lab sources for NL capabilities.
- (U) $ 0.215 66mm NL Grenades – Complete Engineering & Manufacturing Development of 66mm vehicle launched grenades for crowd control and site security missions.
- (U) $ 0.887 Program Support for each service's oversight and administration of the Joint NLW Program.
- (U) $ 0.189 Ground Vehicle Stopper (GVS) –Complete evaluation of several proposed vehicle stopper technologies that have potential to stop/slow ground vehicles.
- (U) $ 2.000 Continue the non-lethal technology innovation initiative to allow pursuit of new NL materials and technologies.
- (U) $ 4.536 Vehicle Mounted Active Denial System (VMADS) - Continue evaluation, testing and target assessment of a HMMWV mounted directed energy system.
- (U) $ 0.513 Running Gear Entanglement System (RGES) – Continue development of a "prop" entanglement capability to stop small, fast moving boats.
- (U) $ 2.759 Develop and evaluate new RDT&E NLW technology initiatives.
- (U) $ 1.585 Foams - Continue evaluation, analysis and testing of both rigid and slippery foams and delivery methods/volumes.
- (U) $ 2.052 Studies and Analysis – Medical and NL casualty data research and collection; human effects assessments; acceptability analysis; and technical studies/analysis of emerging technologies for possible NL application.
- (U) $ 4.192 Concept Exploration Program – Continue to explore and analyze technical NL solutions for clearing facilities and area denial to personnel, and to initiate the exploration of technical solutions to incapacitate personnel, crowd control, disable vessels, and area denial to vehicles.
- (U) $ 0.752 Joint Integration Program (JIP) – Continue to select and test commercial products that will meet Joint Services' requirement for specific NL capability set common items.
- (U) $ 0.183 40mm NL Crowd Dispersal Cartridge – Complete Engineering & Manufacturing Development of a 40mm sting ball with improved range for the M203 40mm Grenade Launcher.
- (U) $ 1.000 NL Mortar – Initiate the development and evaluation of NL mortar demonstrators with a frangible or combustible casing.
- (U) $ 2.000 Initiate an environmental evaluation, impact and safety assessment, technology and remediation capability for NLW candidate systems.
- (U) $ 1.000 Initiate a comprehensive study of the applicability of NL technology area to Weapons of Mass Destruction (WMD).

(U) Total $ 29.309

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603851M Non-Lethal Warfare DEM/VAL**	PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**

FY 2002 Planned Program

- (U) $ 1.361 Execution oversight, administration and support of the Joint NLW Program and technologies database.
- (U) $ 2.257 Evaluation of NLWs by Service warfighting laboratories and Joint Forces Command (JFCOM) for direct user feedback of various NL technologies and munitions.
- (U) $ 0.646 Modeling and simulation validation and verification of NLW in the Joint Conflict and Tactical Simulation (JCATS) model and performance effects data collection.
- (U) $ 1.881 Continue pursuit of new technology through open competition of industry, academia and government lab sources for NL capabilities.
- (U) $ 0.484 Objective Individual Combat Weapons (OICW) – Initial development of NL munitions for the "next generation" combat weapon that will replace selected M16 Rifles, M4 Carbines and M203 Grenade Launchers.
- (U) $ 0.903 Program Support for each service's oversight and administration of the Joint NLW Program.
- (U) $ 0.752 NL Mortar – Continue to explore and evaluate a NL mortar demonstrator with a frangible/combustible casing and drag reduction devices.
- (U) $ 12.298 Vehicle Mounted Active Denial System (VMADS) - Continue evaluation, testing and target assessment of a HMMWV mounted directed energy system.
- (U) $ 3.376 Develop and evaluate new RDT&E NLW technology initiatives.
- (U) $ 1.022 Foams - Continue evaluation, analysis and testing of both rigid and slippery foams and delivery methods/volumes.
- (U) $ 2.160 Studies and Analysis – Medical and NL casualty data research and collection; human effects assessments; acceptability analysis; and technical studies/analysis of emerging technologies for possible NL application.
- (U) $ 3.140 Concept Exploration Program – Continue to explore and evaluate technical NL solutions to incapacitate personnel, crowd control, area denial to vehicles, and disable
- (U) $ 0.430 Joint Integration Program (JIP) – Continue to select and test commercial products that will meet the Joint Services' requirement for specific NL capability set common items.
- (U) $ 0.800 Conduct and evaluate current and emerging NL technologies for operational utility within the naval force protection mission.
- (U) $ 0.400 Conduct a study to determine the operational parameters for NLWs beyond small arms range.
- (U) $ 2.098 Pulsed Energy Projectile (PEP) – Explore the development of laser hardware and characterization of target effects.

(U) Total $ 34.008

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**	PROGRAM ELEMENT NUMBER AND NAME **0603851M Non-Lethal Warfare DEM/VAL**	PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**	

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	**26.132**	**23.580**	**23.982**
(U) Adjustments from the President's Budget:			
(U) SBIR/STTR Transfer	-0.263		-0.383
(U) Execution Adjustment	0.060		
(U) Minor Affordability Adjustment		-0.271	-0.021
(U) Program Adjustment	-0.102	6.000	10.430
(U) FY 2002 President's Budget:	**25.827**	**29.309**	**34.008**

CHANGE SUMMARY EXPLANATION:
(U) Funding: See Above.
(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

(U) B. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Compl	Total Cost
(U) PAN,MC BLI 162800, Non-Lethal Munitions	1.903	4.439	4.461	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
(U) PMC BLI 237100, Operations Other Than War	1.291	1.335	1.552	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) Related RDT&E: Not Applicable.

(U) C. ACQUISITION STRATEGY: *
The JNLWP strategy is to continue to pursue the fielding of NLW systems through modifying COTS products for near term capabilities and the development of new technology NLW systems in various stages of Acquisition. These are balanced with efforts in modeling and simulation, experimentation, and state-of-the-art technology investment. The Acquisition Stragegy for each weapon system is largely lead service dependent.

(U) D. SCHEDULE PROFILE: Not Applicable.

CLASSIFICATION:

Exhibit R-3 Cost Analysis							DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**		PROGRAM ELEMENT **0603851M Non-Lethal Warfare DEM/VAL**					PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**				
Cost Categories (Tailor to WBS, or Sys/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Dev											0.000	
Ancillary Hardware Dev											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
	MIPR	USAIC, Ft. Benning, GA	2.190	0.503		0.255		0.300		Continuing	Continuing	
	WR	MCWL, Quantico, VA	1.150	0.049		0.100		1.500		Continuing	Continuing	
	MIPR	ARDEC, Picatinny, NJ	29.799	9.145		6.097		5.776		Continuing	Continuing	
	WR	NSWC, Various	5.411	1.278		3.472		3.412		Continuing	Continuing	
	MIPR	Kirtland AFB, NM	10.415	4.328		4.536		12.030		Continuing	Continuing	
	MIPR	JWCF, Ft. Monroe, VA	0.550			0.320		0.300		Continuing	Continuing	
	WR	MCSC, Quantico,VA		5.199		8.880		3.854		Continuing	Continuing	
	MIPR	NSMA,Arlington, VA		1.022	10/99	0.987		2.098		Continuing	Continuing	
	RCP	MCLB, Albany,GA		0.250	10/99	0.300	05/01	0.300	01/02	Continuing	Continuing	
	MIPR	Various (M&S)		0.202	10/99	0.591		0.346		Continuing	Continuing	
	MIPR	Various (TIP)	1.375	1.215		1.080		1.545		Continuing	Continuing	
	MIPR	Various (Service)	3.452	1.020		0.846		0.786		Continuing	Continuing	
Subtotal Product Dev			54.342	24.211		27.464		32.247		Continuing	Continuing	

Remarks:

CLASSIFICATION:

Exhibit R-3 Cost Analysis								DATE: **June 2001**					
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**			PROGRAM ELEMENT **0603851M Non-Lethal Warfare DEM/VAL**					PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
Development Support Equip											0.000		
Software Development											0.000		
Training Development											0.000		
Integrated Logistics Support											0.000		
Configuration Management											0.000		
Technical Data											0.000		
	WR	MCSC, Quantico, VA	1.377	0.580		0.435		0.400		Continuing	Continuing		
	WR	NSWC, Dahlgren, VA	1.049	0.216		0.218		0.218		Continuing	Continuing		
	RCP	CTQMSC, Quantico, VA	3.892	0.593	12/99	0.370	12/00	0.540	12/01	Continuing	Continuing		
	Various	Various	2.730	0.227		0.822		0.603		Continuing	Continuing		
Subtotal Support			9.048	1.616		1.845		1.761					
Remarks:													

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Eval											0.000	
Operational Test & Eval											0.000	
Tooling											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		Continuing	Continuing	
Remarks:												

CLASSIFICATION:

Exhibit R-3 Cost Analysis							DATE: **June 2001**					
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /BA-4 Demonstration/Validation**		PROGRAM ELEMENT **0603851M Non-Lethal Warfare DEM/VAL**					PROJECT NUMBER AND NAME **C2319 Non-Lethal Weapons Program**					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Contractor Eng Suppt											0.000	
Govt Engineering Suppt											0.000	
Program Mngmnt Suppt											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost				25.827		29.309		34.008		Continuing	Continuing	

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603857N PROJECT NUMBER: X2691
PROGRAM ELEMENT TITLE: All Service Combat Identification Evaluation Team PROJECT TITLE: ASCIET

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2691 All Service Combat Identification Evaluation Team (ASCIET)										
	13,898	12,989	13,530	0	0	0	0	0	CONT.	CONT.
TOTAL	13,898	12,989	13,530	0	0	0	0	0	CONT.	CONT.

Note: ASCIET was transferred from the Joint Staff to the Navy in FY00.

A. (U)MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The All Service Combat Identification Evaluation Team (ASCIET) was formed from the OSD-Sponsored Joint Air Defense Operations/Joint Engagement Zone (JADO/JEZ) Joint Test and Evaluation Program conducted during FY 1990 through FY 1994. The ASCIET mission is to investigate, evaluate and assess combat identification (CID) concepts and selected critical warfighting areas on the joint battlefield and provides recommendations that address organization, systems, technology, tactics, techniques and procedures (TTP) and doctrine. The ASCIET 2001 evaluation will be conducted in September 2001 at the Camp Shelby ranges and also utilize the Gulfport Combat Readiness Training Center.

B. (U)JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it evaluates integrated technologies in a realistic operational environment; assesses the performance potential of current TTPs, and weapons systems; and helps expedite technologies meeting joint warfighters' needs.

C. (U)PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U)FY 2000 Accomplishments:
   - (U)($6,034) Evaluation Support. The ASCIET 2000 Evaluation was conducted from 28 February through 10 March 2000 in an area encompassing Fort Stewart, Hunter AAF, Wright AAF, Savannah GA ANG Combat Readiness Training Center (CRTC), NAS Jacksonville, FL W-157/158 (over-water ranges), and the Quick Thrust/Gator/Moody, and Live Oak MOAs. This evaluation was comparable in size and scope to the ASCIET 1999 Evaluation. The mission areas for the ASCIET 2000 Evaluation were Surface to Surface (S-S), Air-to Surface (A-S), and Air Defense (AD). ASCIET 2000 was fifth in a series of combat ID evaluations. ASCIET paid for the travel and per diem of approximately 3,500 active duty, reserve and national guard participants. Involvement also included service sponsored technologies from industry and United Kingdom Forces. Every participant moving on the battlespace during the vulnerability window was instrumented for Time-Space-Position Information (TSPI) and weapon engagements. ASCIET-funded contractor support was used for the installation of all instrumentation as well as its reliability and accuracy. OPFOR vehicles and air defense systems comprised actual Former Soviet Union equipment and were leased and transported from home base to the evaluation location. Real-time Casualty Assessments (RTCA) and kill removals were used when appropriate. Participants compared their perceptions (tactical picture) against what actually took place on the battlefield (truth data) during post-mission debriefs. Participants were encouraged to develop innovations in Tactics, Techniques, and Procedures (TTP) to improve joint combat ID during the course of the evaluation. In addition to TTP excursions, ASCIET also measured the influence of certain developmental technologies against the baseline of currently fielded systems. This class of technology was considered “on-line”, and the influence of those technologies on combat ID will be evaluated and reported. ASCIET also allowed certain technologies to participate on a not-to-interfere basis or “off-line” status. “Off-line” technologies are not part of the analysis and are not evaluated in the ASCIET final report.

- (U)($1,401)ASCIET Support. ASCIET is a tenant of Eglin AFB and utilized base support to include utilities, waste disposal, cleaning contracts. These are new costs for ASCIET incurred by the transfer to CINCUSJFCOM. In prior years, ASCIET as Detachment 1 of the 53rd Fighter Wing, was not required to pay such bills as they were covered by the 53rd Fighter Wing. ASCIET will maintain and upgrade its analytical capabilities with software and hardware improvements. The following major documents were published for ASCIET 2000: Evaluation Spin-up Plan, Evaluation Plan 45-day Quick Look Report and Final Report. Quick Look and Final results briefings were prepared and presented to the Joint Staff, the Services and the Commanders-in-Chief (CINCs). The ASCIET staff also provides technical and operational support to forums dealing with combat ID issues e.g., the Joint Integrated Air Defense Interoperability Working Group and the Worldwide Combat ID conference.

- (U)($6,128) Annual Contracts. The ASCIET 2000 evaluation scenario was developed to closely mirror real world joint combat operations. Participant command and control system data tactical displays, voice and data link communications, identification system data engagement decisions were thoroughly analyzed to determine causes of fratricide and assist in developing solutions. Overall mission effectiveness to include exchange ratios, lost shot opportunities and missed targets were also evaluated and analyzed. ASCIET's focus is on tactics, techniques and procedures (TTP), interoperability and combat systems. A white force (evaluation control) network will be designed and constructed to meet ASCIET 2001 scenario requirements. A classified debriefing network will also be designed and constructed to allow participants at eight different geographical locations, including ships at sea, to debrief the daily missions. This debriefing process will allow participants the opportunity to discover, learn, and adjust TTP and systems performance for the following day.

- (U)($335) Conferences. ASCIET hosted the following conferences: Airspace, OPFOR, Initial Planning, Mid-Planning, and Final Planning. Warfighter participants were an integral part of the planning process for realistic scenario development and preparation for interoperability among the services.

2. (U)FY 2001 PLAN:

- (U)($4,510) Evaluation Support. ASCIET 2001 will be a simulated combat, realistic, joint task force scenario in a littoral battlespace. ASCIET's expanded surface-to-surface and air-to-surface operations will require full instrumentation of a battalion size task force, an opposing (OPFOR) and airborne platforms. Air defense platforms including aircraft, ships at sea and land based

assets will be fully instrumented. Instrumentation provides time, space, position information and shot pairing for real time casualty assessment, and kill removal for post-mission and post-evaluation analysis. Results from the instrumentation will point to solutions to combat ID deficiencies. Contractor support will be required for instrumentation installation and checkout to ensure instrumentation is reliable and accurate. OPFOR vehicles and air defense systems will be actual Former Soviet Union equipment and will be leased and transported from home base to the evaluation location. ASCIET will fund travel, billeting and per diem for 3500 participants consisting of service warfighters and augmentees for security, weapons systems expertise and airspace support (FAA). Site visits required to prepare for the evaluation will be conducted as necessary. The venue for ASCIET 2001 is Camp Shelby and the Gulfport CRTC, Mississippi operating locations.

- (U)($1,443) ASCIET Support. ASCIET will remain a tenant at Eglin AFB requiring base support including utilities, waste disposal and cleaning contracts. These were new costs for ASCIET in FY 00, brought about due to the transfer to USJFCOM. In prior years, ASCIET as Detachment 1 of the 53rd Wing was not required to pay such bills. ASCIET will maintain and upgrade analytical capabilities with needed software and hardware improvements. The following major documents will be published for ASCIET 2001: Evaluation Spin-up Plan, Evaluation Plan, 45-day Quick Look Report and a Final Report. Quick Look and Final results briefings will be prepared and presented to the Joint Staff, the Services and the Commanders-in-Chief (CINCs). The ASCIET staff will provide technical and operational support to forums dealing with combat ID issues e.g., the Joint Integrated Air Defense Interoperability Working Group and the World Wide Combat ID conference.

- (U)($6,736) Annual Contracts. The ASCIET 2001 evaluation scenario will be developed to mirror real world joint combat operations. Participant command and control systems, data tactical displays, voice and data link communications, identification systems and data engagement decisions will be thoroughly analyzed to determine causes of fratricide and assist in developing solutions. Overall combat effectiveness to include exchange ratios, lost shot opportunities and missed targets will also be evaluated and analyzed. ASCIET's focus will be on tactics, techniques and procedures (TTP), interoperability and combat systems. A white force (evaluation control) network will be designed and constructed to meet ASCIET scenario requirements. A classified debriefing network will also be designed and constructed to allow participants at different geographical locations, including ships at sea, to debrief the daily missions. This debriefing process will allow participants the opportunity to discover, learn and adjust TTP and systems performance for the subsequent mission.

- (U)($300) Conferences. ASCIET will host five planning conferences: Airspace, OPFOR, Initial Planning, Mid-Planning and Final Planning. Through these planning conferences, warfighter participants will be an integral part of the planning process including scenario development and preparation for interoperability between the services.

3.(U)FY 2002 PLAN:

- ($4,715)Evaluation Support. ASCIET's expanded surface-to-surface and air-to-surface operation will continue to require full instrumentation of a battalion size task force, an opposing (OPROR) and airborne platforms. Air defense platforms including aircraft, ships at sea and land based assets will be fully instrumented. Instrumentation provides time, space, position information and shot pairing for real time casualty assessment, and kill removal subsequent analysis. Results from the instrumentation will point to solutions to combat ID deficiencies. Contractor support will be required for instrumentation installation and checkout and to ensure instrumentation is reliable and accurate. OPFOR vehicles and air defense systems will be real Former Soviet Union equipment and will be leased and transported from their home base to the evaluation location. ASCIET will fund travel, billeting and per diem for participants consisting of service warfighters and augmentees for security, weapons systems expertise and airspace support (FAA). Site visits required to prepare for the evaluation will be conducted as necessary.

- (U)($1,442) ASCIET Support. ASCIET will remain a tenant at Eglin AFB requiring base support including utilities, waste disposal and cleaning contracts. These were new costs for ASCIET in FY 00, brought about due to the transfer to USJFCOM. In prior years, ASCIET as Detachment 1 of the 53rd Wing was not required to pay such bills. ASCIET will maintain and upgrade analytical capabilities with needed software and hardware improvements. The following major documents will be published for ASCIET 2002: Evaluation Spin-up Plan, Evaluation Plan, 45-day Quick Look Report and a Final Report. Quick Look and Final results briefings will be prepared and presented to the Joint Staff, the Services and the Commanders-in-Chief (CINCs). The ASCIET staff will provide technical and operational support to forums dealing with combat ID issues e.g., the Joint Integrated Air Defense Interoperability Working Group and the World Wide Combat ID conference.

- (U)($7,073) Annual Contracts. The ASCIET 2002 evaluation scenario will be developed to mirror real world joint combat operations. Participant command and control systems, data tactical displays, voice and data link communications, identification systems and data engagement decisions will be thoroughly analyzed to determine causes of fratricide and assist in developing solutions. Overall combat effectiveness to include exchange ratios, lost shot opportunities and missed targets will also be evaluated and analyzed. ASCIET's focus will be on tactics, techniques and procedures

(TTP), interoperability and combat systems. A white force (evaluation control) network will be designed and constructed to meet ASCIET scenario requirements. A classified debriefing network will also be designed and constructed to allow participants at different geographical locations, including ships at sea, to debrief the daily missions. This debriefing process will allow participants the opportunity to discover, learn and adjust TTP and systems performance for the subsequent mission.

- (U)($300) Conferences. ASCIET will host five planning conferences: Airspace, OPFOR, Initial Planning, Mid-Planning and Final Planning. Through these planning conferences, warfighter participants will be an integral part of the planning process including scenario development and preparation for interoperability between the services.

D. (U) PROGRAM CHANGE SUMMARY: ASCIET was realigned from the Joint Staff to the Navy effective FY 00. Prior year funds are reflected in the Joint Staff RDT&E, DW budget submission.

FY 2000: JCS directed Navy fair share for the full scale 2000 Evaluation (One time +$1,000K)
Section 8055 Congressional Proportionate Rescission (-$51K)

FY 2001: Section 8086 .7% Pro-Rata Reduction (-$92K)
Government-Wide Rescission: PL 106-554, Sec 14 (-$29K)

E. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) Procurement		*						*
(U) O&M		*						*

Note: *O&M and procurement funds remain funded with Air Force (Air Combat Command) and did not shift to Navy for executive agency.

F.(U) ACQUISITION STRATEGY

FY 2000 – 03.

Competitive contract was awarded to SAIC in Sept 98 on a GSA schedule for ASCIET advisory and technical support, also contract awarded to MEVATEC on 1 Feb 95 (2 year + 3 option years). Plan to compete through GSA in FY 02. Authorize several sole source contracts for short periods to conduct scheduled evaluations that include video conferencing ability, and software applications and instrumentation packages for vehicles for data collection.

G. (U) SCHEDULE PROFILE: Not Applicable

EXHIBIT R-3, FY 2002 RDT&E,N PROJECT COST ANALYSIS **DATE: MAY 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603857N** **PROJECT NUMBER: X2691**

PROGRAM ELEMENT TITLE: All Service Combat Identification Evaluation Team **PROJECT TITLE: ASCIET**

Exhibit R-3 Cost Analysis (page 1)											Date: MAY 2001		
APPROPRIATION/BUDGET ACTIVITY 1319/BA 4			PROGRAM ELEMENT: 0603857N								PROJECT NAME AND NUMBER: ASCIET/X2691		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Operational Test & Evaluation	C/FP PO	SAIC Eglin AFB	4214	4492	01/01	4717	01/02			Cont	Cont	Cont
Operational Test & Evaluation	SS/CPFF MIPR	Stanford Research Inst., Menlo Park CA	1575	812	04/01	615	12/01			Cont	Cont	Cont
Operational Test & Evaluation	SS/FP PO	MEVATEC Eglin AFB	1914	2244	02/01	2356	02/02			Cont	Cont	Cont
Evaluation Other Costs	Niper/ PO	FY00 Savannah FY01 Gulf Port Camp Shelby MS	4209	3448	Var	3665	Var			Cont	Cont	Cont
Travel and Conference		ASCIET/Various	735	700	Var	735	Var			Cont	Cont	Cont
Operation Costs/Research		ASCIET/Various	1251	1293	Var	1442	Var			Cont	Cont	
Subtotal T&E			13898	12989		13530				Cont	Cont	Cont
Remarks:												
Subtotal Support												

EXHIBIT R-3, FY 2002 RDT&E,N PROJECT COST ANALYSIS

DATE: MAY 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603857N

PROGRAM ELEMENT TITLE: All Service Combat Identification Evaluation Team

PROJECT NUMBER: X2691

PROJECT TITLE: ASCIET

Remarks

EXHIBIT R-3, FY 2002 RDT&E,N PROJECT COST ANALYSIS **DATE: MAY 2001**

BUDGET ACTIVITY: 4 **PROGRAM ELEMENT: 0603857N** **PROJECT NUMBER: X2691**

PROGRAM ELEMENT TITLE: All Service Combat Identification Evaluation Team **PROJECT TITLE: ASCIET**

Exhibit R-3 Cost Analysis (page 2)									Date: SEP 2000			
APPROPRIATION/BUDGET ACTIVITY: 1319/BA 4		PROGRAM ELEMENT: 0603857N							PROJECT NAME AND NUMBER: ASCIET/x2691			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost			13898	12989		13530				Cont.	Cont.	Cont.
Remarks												

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: JUNE 2001			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA-4**					R-1 ITEM NOMENCLATURE **0603879N SINGLE INTEGRATED AIR PICTURE (SIAP) SYS ENG**					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2006	Cost to Complete	Total Cost
Total PE Cost	**0.000**	**20.000**	**43.140**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

A. (U) Mission Description and Budget Item Justification

A Single Integrated Air Picture (SIAP) is the product of fused, near-real-time and real-time data from multiple sensors to allow development of common, continuous, and unambiguous tracks of all airborne objects in the surveillance area. All airborne objects must be detected, tracked, and reported. Each object must have one and only one track identifier and associated characteristics to be incorporated into a single combat identification process. Current systems do not provide this capability. The SIAP System Engineering (SE) Task Force was approved by the Joint Requirements Oversight Council (JROC) in March 2000, and chartered in October 2000 by the Under Secretary of Defense to perform "the system engineering needed to fix problems in the existing Joint Data Network (JDN) and to guide development toward a future SIAP capability." This PE is funded by all the services and controlled by SIAP Acquisition Executive.

The SIAP Task Force will develop the tools and processes and perform the system engineering that will identify cost effective fixes to Tactical data link systems. The resulting prioritized list of fixes will be addressed in incremental blocks designed to improve the SIAP. Each Block will identify specific changes to be implemented in specific systems to improve the Joint Theater Air and Missile Defense Family of Systems SIAP capability. These changes will identify the engineering specifications, supporting rationale (test results and analysis), and acquisition estimate expected to implement the changes. Once approved by the JROC, implementation of these recommended changes is the responsibility of the affected Service programs.

• Block 0 addresses four joint warfighting shortfalls selected for their impact on the JDN, their applicability across the Services, and the engineering maturity reflected by interface change proposals already on-record with the Joint Interoperability for Tactical Command and Control system process. Block 0 provides the catalyst for prototyping the SIAP system engineering processes that will be developed and used to address these change proposals. The change proposals that will be addressed are: improved Correlelation/Decorrelation, Formation Tracking/Correlation, Identification taxonomy and symbology, and an ID conflict resolution matrix.

• Block 1 will address a prioritized subset of JDN deficiencies determined by the SIAP SE Task Force and United States Joint Forces Command to provide the greatest operational benefit to the warfighter which can be implemented in the near- to mid-term.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA-4**	R-1 ITEM NOMENCLATURE **0603879N SINGLE INTEGRATED AIR PICTURE (SIAP) SYS ENG**

A. (u) Mission Description and Budget item justification (cont.)

SIAP RDT&E Budget ($M)

		FY00	FY01	FY02
Block 0				
	Reqts Analysis	**-**	**$1.250**	**$0.150**
	Functional Analysis	**-**	**$10.900**	**$0.300**
	Acquisition Assessment	**-**	**$1.350**	**$0.400**
	SIAP Architecture	**-**	**$0.350**	**$0.050**
	Program Mgt	**-**	**$2.700**	**$0.100**
	Engineering Controls	**-**	**$1.050**	**$0.200**
	Total	**$0.000**	**$17.600**	**$1.200**
Block 1				
	Reqts Analysis	**-**	**$0.175**	**$3.025**
	Functional Analysis	**-**	**$1.730**	**$25.610**
	Acquisition Assessment	**-**	**$0.175**	**$3.225**
	SIAP Architecture	**-**	**$0.070**	**$1.330**
	Program Mgt	**-**	**$0.100**	**$5.900**
	Engineering Controls	**-**	**$0.150**	**$2.850**
	Total	**$0.000**	**$2.400**	**$41.940**

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY2001 PLAN ($20.0M)

This effort will recommend Joint Data Network fixes to improve the JTAMD Fos SIAP performance and lay the groundwork for engineering concepts needed to support the 2010 Integrated Architecture.

Key Events include:

- Modifying evaluation tools and infrastructure to support a disciplined system engineering process in support of Block 0.

identify the specific changes to be implemented in specific systems to improve the JTAMD FoS SIAP capability. This will include engineering specifications, supporting rationale, and acquisition cost/schedule estimates.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA-4**	R-1 ITEM NOMENCLATURE **0603879N SINGLE INTEGRATED AIR PICTURE (SIAP) SYS ENG**

Other FY 2001 activity includes:

- June 2001 delivery of a set of initial operational, technical and performance Measures of Effectiveness/Measures of Performance that will objectively assess SIAP capacity and capability.

- July 2001 delivery of a SIAP Lessons Learned Database that consolidates and leverages previous related activities, exercises, and real world operations.

- July 2001 delivery of a Prioritized Block Improvement list that establishes the criteria and prioritizes proposed JDN fixes based on estimated cost, schedule, and contribution to the air picture. This list will be divided into blocks to facilitate detailed engineering and recommend solutions for implementation.

- Capability and Limitations Document: development begins in FY 2001, with a scheduled delivery in December 01. This will document SIAP related capabilities and limitations of the Joint Theater Air and Missile Defense Family of Systems (JTAMD FoS). It will provide a tool for the warfighter to extract the highest level of SIAP performance possible from the existing Theater Air and Missile Defense architecture and will serve as a tool for the Joint Interface Control Officer.

- System Engineering Management Plan: Development of the SEMP begins in FY 2001, with a scheduled delivery in Dec 2001. The SEMP provides a uniform framework for controlling all SIAP products.

- Work also begins on the SIAP Normative Baseline, SIAP Roadmap, and the SIAP Component of the Theater Air Missile Defense 2010 Integrated Architecture, which all have scheduled deliveries in December 2002.

- Block 1 Improvement Plan: Development of the Block 1 Improvement Plan begins in FY 2001, with a scheduled delivery to the JROC in December 2002. This plan will identify the specific changes to be implemented in specific systems to improve the JTAMD FoS SIAP capability. This will include engineering specifications, supporting rationale, and acquisition cost/schedule estimates.

Once approved by the JROC, implementation of these recommended changes is the responsibility of the affected Services.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: JUNE 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA-4**	R-1 ITEM NOMENCLATURE **0603879N SINGLE INTEGRATED AIR PICTURE (SIAP) SYS ENG**

2. (U) FY2002 PLAN ($43.140M)

This effort will recommend Joint Data Network enhancements to improve the JTAMD FoS SIAP performance and lay the groundwork for engineering concepts needed to support the 2010 Integrated Architecture. Specific products will include a prioritized list of fixes that will provide the most "bang for the buck"; a set of metrics to define the completeness, continuity, and accuracy of target tracks; and a description of the systems used by the services and the capabilities and limitations of those systems in providing a Single Integrated Air Picture.

Key Events include:

- Focus on JDN enhancements to improve the JTAMD FoS SIAP performance, resulting in the delivery of Block 1.

- Block 1 Improvement Plan: Development of the Block 1 Improvement Plan continues in FY 2002, with a scheduled delivery to the JROC in December 02. This plan will identify the specific changes to be implemented in specific systems to improve the JTAMD FoS SIAP capability. This will include engineering specifications, supporting rationale, and acquisition estimates/costs.

Other FY 2002 activities include:

- December 2001 delivery of Block 0 Improvement Plan to the JROC. This plan will identify the specific changes to be implemented in specific systems to achieve specific improvements to the JTAMD FoS SIAP capability. This will include engineering specifications, supporting rationale, and acquisition estimates/costs.

- December 2001 delivery of Capability and Limitations Document. This gives the Theater Commander a description of the capabilities and limitations of the Joint Theater Air and Missile Defense Family of Systems (JTAMD FoS). It will provide a tool for the warfighter to extract the highest level of SIAP performance possible from the existing Theater Air and Missile Defense architecture.

- Dec 01 Delivery of System Engineering Management Plan. The SEMP provides a uniform framework for controlling all SIAP products.

- SIAP Normative Baseline: Development continues in FY 2002, with a scheduled delivery of December 2002. The Normative Baseline will comprise the set of SIAP requirements, specifications, interface definitions, and metrics the define the expected SIAP capability of current contributing systems. This will be the yardstick against which current SIAP deficiencies and future objective capabilities will be measured.

- SIAP Component of the Theater Air Missile Defense 2010 Integrated Architecture: Development continues in FY 2002 with a scheduled delivery in December 2002. The SIAP component of the TAMD architecture defines the Joint interfaces and connectivity, Joint performance requirements, and the associated information exchange requirements data models. It will represent key elements of a normative baseline for some future/objective SIAP (in comparison to the Normative Baseline's focus on existing systems).

- SIAP Roadmap: Development continues in FY 2002 with a scheduled delivery of December 2002. The SIAP Roadmap builds on the Prioritized Block Improvement List by defining mid- and far-term block upgrades to satisfy operational requirements leading to the objective SIAP capability. It will define the path from current capabilities, through the Normative Baseline, to the objective SIAP capability (2010 Architecture).

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY BA-4**	R-1 ITEM NOMENCLATURE **0603879N SINGLE INTEGRATED AIR PICTURE (SIAP) SYS ENG**

B: Program Change Summary

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget:		0.000	0.000
Adjustments to FY 2000/FY 2001 Appropriated Value			
FY 2001 President's Budget		0	0
FY 2002 PRES Budget:		20.000	43.140

Funding:

FY01 - Funds were rerprogammed to initiate the SIAP program. (+3.947) Below Threshold Reprogramming, (+16.053) Above Threshold Reprogramming
FY02 - The Departmenr realigned funds to support SIAP requirements through the end of FY 2002 (+43.140)

Technical: N/A

C. OTHER PROGRAM FUNDING SUMMARY: N/A

D. ACQUISITION STRATEGY: N/A

E. SCHEDULE PROFILE: N/A

Exhibit R-3 Cost Analysis (page 1)													DATE: **JUNE 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N BA 4**			PROGRAM ELEMENT **0603879N**			PROJECT NAME AND NUMBER **Single Integrated Air Picture (SIAP) Sys Eng S3031**							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
Reqts Analysis	MIPR/ IPIR/PD	var	0.000			1.425	var	3.175	var	continuing	continuing	continuing	
Functional Analysis	MIPR/ IPIR/PD	var	0.000			12.630	var	25.910	var	continuing	continuing	continuing	
Acquisition Assessment	MIPR/ IPIR/PD	var	0.000			1.525	var	3.625	var	continuing	continuing	continuing	
SIAP Architecture	MIPR/ IPIR/PD	var	0.000			0.420	var	1.380	var	continuing	continuing	continuing	
Program Management	MIPR/ IPIR/PD	var	0.000			2.800	var	6.000	var	continuing	continuing	continuing	
Engineering Controls	MIPR/ IPIR/PD	var	0.000			1.200	var	3.050	var	continuing	continuing	continuing	
Subtotal			0.000			20.000		43.140		continuing	continuing	continuing	

Remarks:

R-1 SHOPPING LIST - Item No. 89-6 of 89-6

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification									DATE: **May 2001**	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**						R-1 ITEM NOMENCLATURE 0604272N/ Tactical Aircraft Directed InfraRed Survivabillity					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Total PE Cost	**0.000**	**0.000**	**0.000**	**18.034**	**20.000**	**20.000**	**0.000**	**0.000**	**0.000**	**372.500**	**430.534**
E3040/ Tactical Aircraft Directed InfraRed Countermeasures				**18.034**	**20.000**	**20.000**				**372.500**	**430.534**
				4	**4**						**8**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops an infrared countermeasure (IRCM) system for use on tactical fixed wing high performance aircrafts. The IRCM system consists of an infrared missile warning subsystem and an infrared jamming system to provide aircraft with increased surviability against infrared threats.

(U) JUSTIFICATION FOR BUDGET ACTIVITY:
Tactical Aircraft Directed InfraRed Countermeasure (TADIRCM) is needed to provide advanced technology development efforts for a future infrared countermeasures system for tactical fixed wing high performance airrcraft. The focus is on technology development and risk reduction efforts on system components to include a multi-color infrared detector, missile warning sensor, a multi-band laser, and a miniature tracker/jammer.

This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

R-1 SHOPPING LIST - Item No. 90

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA5**	PROGRAM ELEMENT NUMBER AND NAME 0604272N/Tactical Aircraft Directed InfraRed Countermeasure					PROJECT NUMBER AND NAME E3040/TADIRCM *					
COST ($ in Millions)	Prior Years Cost	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Program
Project Cost	**0.000**	**0.000**	**0.000**	**18.034**							
RDT&E Articles Qty				**4**							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops an infrared countermeasures (IRCM for use on tactical fixed wing high performance aircrafts. The IRCM system consists of an infrared missile warning subsystem and an infrared jamming system to provide aircraft with increased survivability against infrared threats. TADIRCM is needed to provide advanced technology development efforts for a future infrared countermeasures system for tactical fixed wing high performance aircraft. The focus is on technology development and risk reduction efforts on system components to include a multi-color infrared detector, missile warning sensor, a multi-band laser, and a miniature tracker/jammer.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2000 ACCOMPLISHMENTS: Not Applicable

2. FY 2001 PLANS: Not Applicable

3. FY 2002 PLANS:
   (U) $14.300 TADIRCM: Commence funding development contract's) for TADIRCM
   (U) $ 2.500 TADIRCM: Commence engineering, technical and logistics support
   (U) $ 1.234 TADIRCM: Commence threat assessment, aircraft integration, and program alternative studies

*This PE is new in FY 2002 and it was erroneously left off of the R-1 exhibit.

R-1 SHOPPING LIST - Item No. 90

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **May 2001**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-4	0604727N/Tactical Aircraft Directed InfraRed Countermea	E3040/TADIRCM

(U) B. PROGRAM CHANGE SUMMARY:

	FY2000	FY2001	FY2002
(U) FY 2001 President's Budget:	0	0	0
(U) Adjustments from the President's Budget:	0	0	18.034
(U) FY 2002 President't Budget Submit:	0	0	18.034

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2002 net increase of $18.034 consists of a new program funding increase of $18.000 million and an increase of $.034 million for additional program support.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Related RDT&E: 0603270N, Advanced Technology-Received FY01 Congressional add of $4.9M for the purpose of TADIRCM risk reduction efforts. The funds will be used for the following: to perform studies regarding the threat, system performance and test requirements and platform integration, complete a field demonstration of the hardware, and update hardware and models based on field testing.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: **May 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**	PROGRAM ELEMENT NUMBER AND NAME 0604272N/Tactical Aircraft Directed InfraRed Countermeasure	PROJECT NUMBER AND NAME E3040/TADIRCM	

(U) D. ACQUISITION STRATEGY: TADIRCM - full and open competiition development contract(s) (FY02).

(U) E. SCHEDULE PROFILE:

	FY 2000	FY 2001	FY 2002	FY 2003
(U) Program Milestones				
(U) Engineering Milestones				
(U) T&E Milestones				
(U) Contract Milestones			2Q/02 Development contract awards(s)	

R-1 SHOPPING LIST - Item No. 90

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**		PROGRAM ELEMENT 0604272N/Tactical Aircraft Directed InfraRed Countermeas			PROJECT NUMBER AND NAME E3040/TADIRCM							
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware DevelopmentMWS	C-CPFF	TBD				9.000	12/01					
primary Hardware DeveloptDIRCM	C-CPFF	TBD				4.800	11/01					
Aircraft Platform Integration System	SS/FFP	Boeing, MO				0.500	12/01					
Subtotal Product Development			0.000	0.000		14.300						
Remarks:												
Subtotal Support			0.000	0.000		0.000				0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 90

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0604272N/Tactical Aircraft Directed InfraRed Countermeas			PROJECT NUMBER AND NAME E3040/TADIRCM						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX/RX	NAWC AD/ PAX RVR MD										
Developmental Test & Evaluation	WX/RX	NAWC WD/ China Lake										
Subtotal T&E			0.000	0.000		0.000						
Remarks:												
Government Engineering Support	WX/RX	NAWC AD, PAX RVR MD				1.400	11/01					
Government Engineering Support	WX/RX	NAWC WD/ China Lake				0.500	11/01					
Program Management Support	WX/RX	NAWC AD/ PAX, Various				0.900	11/01					
Travel		Various				0.150	11/01					
Miscelleanous efforts < $1 million		Various				0.784	11/01					
Subtotal Management			0.000	0.000		3.734						
Remarks:												
Total Cost			0.000	0.000		18.034						
Remarks:												

R-1 SHOPPING LIST - Item No. 90

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4**					R-1 ITEM NOMENCLATURE Hardened Target Munitions - 0604327N					
COST ($ in Millions	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**4.591**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont.**	**Cont.**
J2331 Hard Target Munitions	**4.591**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont.**	**Cont.**
Quantity of RDT&E Articles										

A. Mission Description and budget Item Justification The Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: The Advanced Penetrator Definition Program is appropriately justified in BA-4, Demonstration and Validation, as this effort evaluates advanced conventional earth penetrating warhead materials in as realistic an operating environment as possible to assess the performance of advanced technology.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4**	R-1 ITEM NOMENCLATURE Hardened Target Munitions - 0604327N

B. Program Change Summary

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	4.897	0.000	0.000
(U) Appropriated Value:	4.897	0.000	
(U) Adjustment to FY00/01 Appropriated Value/FY01 PRESBUD:	-0.306	0.000	0.000
(U) FY 2002/2003 OSD/OMB Budget:	4.591	0.000	0.000

Funding:

Explanation: Changes from FY 2001 President's Budget to FY 2002 President's Budget submission: The decrease of -$0.3M in FY 2000 is a result of: a Below Threshold Reprogramming (-$0.2), SBIR reduction
(-$0.1).

C. (U) Other Program Funding Summary: See enclosed R-2a for each individual project data.
D. (U) Acquisition Strategy: See enclosed R-2a for each individual project data.
E. (U) Schedule Profile: Not Applicable.

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **Hardened Target Munitions - 0604327N**				PROJECT NAME AND NUMBER Hard Target Munitions - J2331					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**4.591**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Cont.**	**Cont.**
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification
The Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000 ACCOMPLISHMENTS:
(U) ($4.6) Continued Advanced Penetrator Definition program. Design efforts will focus on risk reduction technology efforts. Full obligation is projected by the 4th quarter of the first year. FY 2000 efforts include:

- (U) Defined penetrator fuze requirements.
- (U) Initiated testing to obtain environment data on penetrators which impact concrete at velocities up to 4000 feet per second.
- (U) Initiated preliminary design of the missile/reentry body separation system.
- (U) Initiated trade studies focusing on internal packaging and system guidance architectures.
- (U) Defined GPS receiver design and data processing options that optimize system accuracy and minimize degradation due to jamming.
- (U) Provided funds to the Air Force for completion of Analysis of Alternatives (AOA) activities.

2. (U) FY 2001 PLAN: *
3. (U) FY 2002 PLAN:*
4. (U) FY 2003 PLAN*

* There is no Navy funding required for HTM in fiscal years 2001-2003. The Tactical Missile System (TACMS) Penetrator Demonstration is now an Advanced Concept Technology Demonstration (ACTD). This demonstration was initiated by Navy HTM funding and the balance of the effort is funded with a coordinated fiscal effort by the following organizations: OSD, Defense Threat Reduction Agency (DTRA), and fuze development being provided by Air Force Research Laboratory (AFRL).

B. Other Program Funding Summary: N/A
C. (U) Acquisition Strategy: Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 ©(1) and (3) implemented by FAR 6.302.-1, 3 4.
D. (U) Schedule Profile: Not Applicable.

Exhibit R-3 Cost Analysis (page 1)											DATE: **June 2001**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**			PROGRAM ELEMENT **Hardened Target Munitions - 0604327N**			PROJECT NAME AND NUMBER Hard Target Munitions - J2331							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Ancillary Hardware Development	SS/CPFF	LMDS/CAL.	1.400	0.800	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	PD	ALAM/VA	0.000	0.500	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	WR	AIR FORCE	0.000	0.800	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	MIPR	DOE/NM	1.900	0.700	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	WR	ARMY/ALA	1.300	0.900	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	SS/CPFF	CSDL/MA	0.000	0.700	04/00	0.000	N/A	0.000	N/A			
Ancillary Hardware Development	SS/CPFF	Hicks & Assoc./VA	0.000	0.200	04/00	0.000	N/A	0.000	N/A			
Subtotal Product Development			4.600	4.600		0.000		0.000		Cont.	Cont.	Cont.
Remarks:												
											0.000	
Total Cost			4.600	4.600		0.000		0.000		Continuing	Continuing	
Remarks:												

R-1 SHOPPING LIST - Item No. 92-4 of 92-4

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 4of 4)

FY 2002 RDT&E,N Budget Item Justification Sheet DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE
X0798 OTH Targeting	1,435	2,089	2,112
X2144 SEW Engineering*	8,142	12,043	8,469
R2357 Maritime Battle Center	22,295	23,618	21,678
R2630 Adv Comm Info Tech	2,903	0	0
TOTAL	34,775	37,750	32,259

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) contains three projects: Over-the-Horizon Targeting (OTH-T), Space and Electronic Warfare (SEW) Engineering, and Maritime Battle Center (MBC). The projects are systems engineering non-acquisition programs with the objectives of developing, testing, and validating Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures to support naval missions in Joint and Coalition Theater. The mission of this program element is carried out by multiple tasks that are used to ensure Naval C4ISR Command and Control Warfare (C2W) components of SEW are effectively integrated into the C4ISR architectures. Additionally the program ensures that (1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the Naval C4ISR architecture as related to the objectives of National Defense Strategy and evolving joint visions and direction, such as Joint Vision 2010 (JV 2010), “Copernicus...C4ISR for the 21st Century,” "Forward...From the Sea," C4I For the Warrior, and the Defense Science Board Summer Study Task Force on Information Architecture for the Battlefield and are guided by CINC requirements; and (2) that SEW systems and systems integration effort involves leading-edge

technology transfer of information processing technologies primarily through integration of government and commercial off-the-shelf (GOTS/COTS) products to enhance the Navy's operational capability, interoperability, flexible reconfiguration, as well as reduce costs. The MBC is a distributed organization focusing on concept development, experimentation and analysis tasks are coordinated by the Naval War College, and the Navy Warfare Development Command, with C4ISR technical and acquisition support coordinated by the Space and Naval Warfare Systems Command in FY99. Effective fiscal year 2000, MBC changes claimancies from Space and Naval Warfare Systems Command to Office of Naval Research. The MBC will also act as the Navy representative to the Joint Battle Center and the Battle Labs of other services.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications. It also develops a virtual demonstration and validation environment across Navy for C4ISR.

B. (U) PROGRAM CHANGE FOR TOTAL P.E.:

	FY2000	FY2001	FY2002
(U) FY2001 President's Budget	36,904	34,100	32,507
Execution Adjustment	-872		
Program Adjustment			-248
Inflation Adjustment			
Congressional Rescission	-150	-350	
Congressional Plus-Up		+4,000	
NWCF Adjustment			
SBIR	-1,107		
FY2002 President's Budget Submission	34,775	37,750	32,259

FY 2002 RDT&E,N Budget Item Justification DATE: JUNE 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

FY 2002 RDT&E,N Budget Item Justification DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

(U) COST: (Dollars in Thousands)

NUMBER TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
X0798 OTH Targeting	1,435	2,089	2,112

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Over-the-Horizon Targeting (OTH-T) program provides a virtual, global systems integration and test facility for Information Technology for the 21st Century (IT-21) C4ISR technology that supports the collection, transmission, correlation, and display of track data into a Common Operational Picture (COP) in support of warfighting requirements. This effort was originally undertaken to support targeting of over the horizon weapons such as the TOMAHAWK cruise missile. The common view of the battle space that was provided to the warfighter by OTH-T has been applied across the spectrum of warfare missions; however, the technology and doctrine on which it was based has changed radically in recent years. The result is that the first goal of the OTH-T program is to transition the OTH architectures and systems from older Military Standard (MIL-STD) technologies to COTS (Commercial Off the Shelf) and GOTS (Government Off the Shelf) based technologies that support Network Centric Warfare and the Navy's plan to support JV 2010 implementing IT-21 technology. The second goal of the OTH-T program is to support integration and interoperability of all C4I systems into warfighting capabilities which includes Year 2000 (Y2K) integration and testing. This support includes providing technical expertise afloat and ashore via a cadre of highly-trained Fleet Systems Engineers who ensure smooth integration of new capabilities to enhance OTH-T during major Fleet exercises and demonstrations which are used to validate and evaluate developed portions of configuration. The OTH-T program integration and testing in support of warfighting capabilities included Y2K interoperability testing for both MIL-STD and IT-21 COTS equipment for submarines, surface, and land based components. Allied interoperability is an important issue for future naval operations, especially with the Navy initiative to expand Internet Protocol (IP) networking throughout the Fleet (IT-21 and Naval Intranet). Specific solutions do not exist to solve the IP connectivity issue with Allies. Funding will allow development of solutions for emerging Allied interoperability requirements. Data throughput will need to be increased for the exchange of larger sized files within the limitations of the high frequency (HF) medium in support of, for example, Collaboration at Sea (CAS). Funding will allow for further

development of potential solutions for merging improved transmission control protocol/internet protocol (TCP/IP) capability with advance digital network systems (ADNS) and existing international standards (e.g.: STANAG 5066). Funding will also allow for development of subnet relay protocols which will provide for a significant improvement within and between battlegroups.

FY 2002 RDT&E,N Budget Item Justification DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: OTH TARGETING

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($137) Based on results of integration testing, developed capability functional description documents which are used by the programs of record to define system functional requirements that support these capabilities. Developed system interface standards where required. Provided a valid master configuration database in support of the new IT-21 Battle Group configurations.

- (U) ($284) Conducted systems integration, interoperability, and Y2K testing using the facilities of the Land Based Test Network (LBTN) and Systems Integration Environment. (Reconfigurable Land Based Test Sites (RLBTS) have been expanded to validate IT-21 technologies prior to shipboard installation.)

- (U) ($443) Validated and verified the interoperability of architectures for new capabilities and supporting systems to the fleet. Worked with the fleet staffs and Naval Doctrine Command to develop policy and doctrine for operations of Naval Internet (NI) in support of Network Centric Warfare ideology. Served as technical expert in researching the fleet’s technical questions and providing information.

- (U) ($377) Ensured joint interoperability of all systems on the NI by enforcing compliance with the Joint Technical Architecture and Y2K. Verified relevance, recommended modifications to, and maintained OTH-T specifications for support of distribution of the COP to maritime forces. The program's systems engineers made input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provided connectivity and conducted integration and interoperability testing to verify Y2K compliance and provided systems engineering expertise for both IT-21 and MIL-STD technologies.

- (U) ($194) Conducted integration testing of OTH-T and combat systems.

2. (U) FY 2001 PLAN

- (U) ($247) Integrate code combination techniques developed during FY00 into internationally agreed HF data profiles for significant improvement in guarantee of delivery of email attachments in poor propagation conditions associated with the HF medium.

- (U) ($267) Exploit and coordinate subnet relay protocols and multi-frequency band channels to provide greater data throughput in the HF and ultra high frequency (UHF) Line-of-Site radio frequency (RF) mediums.

- (U) ($152) Based on results of integration testing, develop capability functional description documents which will be used by the programs of record to define system functional requirements that support these capabilities. Develop system interface standards where required. Provided a valid master configuration database in support of the new IT-21 Battle Group configurations.

- (U) ($311) Conduct systems integration and interoperability using the facilities of the Land Based Test Network (LBTN) and Systems Integration Environment (SIE). (Reconfigurable Land Based Test Sites (RLBTS)have been expanded to validate IT-21 technologies prior to shipboard installation.)

- (U) ($488) Validate and verify the interoperability of architectures for new capabilities and supporting systems to the fleet. Work with the fleet staffs and Naval Doctrine Command to develop policy and doctrine for operations of NVI in support of Network Centric Warfare ideology. Serve as technical expert in researching the fleet’s technical questions and providing information.

- (U) ($412) Ensure joint interoperability of all systems on the NI by enforcing compliance with the Joint Technical Architecture. Verify relevance, recommend modifications to, and maintain OTH-T specifications for support of distribution of the COP to maritime forces. The program's systems engineers will make input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provide connectivity and conduct integration and interoperability testing and provide systems engineering expertise for both IT-21 and MIL-STD technologies.

- (U) ($213) Conduct integration testing of OTH-T and combat systems in accordance with OPNAVINST 9410.5.

3. (U) FY 2002 PLAN

- (U) ($245) Integrate code combination techniques developed during FY01 into internationally agreed HF data profiles for significant improvement in guarantee of delivery of email attachments in poor propagation conditions associated with the HF medium. Exploit HF Full Duplex protocols and adaptive compression techniques to greatly improve data throughout.

- (U) ($275) Exploit and coordinate subnet relay protocols and multi-frequency band channels to provide greater data throughput in the HF and UHF Line of Site RF mediums. Exploit HF Beyond-Line-of-Site and Extended-Line-of-Sight ground – and sky – waveforms to improve long range tactical communications. Adapt IP Quality of Service (QOS), Voice over IP (VoIP) and IP VTC (H.323) protocols to subnet relay communications.

- (U) ($152) Based on results of integration testing, develop capability functional description documents which will be used by the programs of record to define system functional requirements that support these capabilities. Develop system interface standards where required. Provided a valid master configuration database in support of the new IT-21 Battle Group configurations.

- (U) ($308) Conduct systems integration and interoperability using the facilities of the Land Based Test Network (LBTN) and Systems Integration Environment. (Reconfigurable Land Based Test Sites (RLBTS) have been expanded to validate IT-21 technologies prior to shipboard installation.)

- (U) ($482) Validate and verify the interoperability of architectures for new capabilities and supporting systems to the fleet. Work with the fleet staffs and Naval Doctrine Command to develop policy and doctrine for operations of NVI in support of Network Centric Warfare ideology. Serve as technical expert in researching the fleet’s technical questions and providing information.

- (U) ($405) Ensure joint interoperability of all systems on the NI by enforcing compliance with the Joint Technical Architecture. Verify relevance, recommend modifications to, and maintain OTH-T specifications for

support of distribution of the COP to maritime forces. The program's systems engineers will make input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provide connectivity and conduct integration and interoperability testing and provide systems engineering expertise for both IT-21 and MIL-STD technologies.

- (U) ($245) Conduct integration testing and certification, in accordance with OPNAVINST 9410.5, of OTH-T and combat systems with tactical data exchanged over CST (Common operational picture (COP) Synchronization Tools) networks and other networks. These CST networks will operate within battle groups and to ashore nodes while other networks will continue to use BGDBM (Battle Group DataBase Management). Integration testing to include testing of GCCS-M and CDS (Combat Decision Systems) two-way interfaces. Testing to also address issues of Time Critical Strike with for example TTWCS (Tomahawk Weapons Control System).

B. (U) OTHER PROGRAM FUNDING SUMMARY:

(U)	FY 2000	FY 2001	FY 2002
PE 0204660N, AGSAG 4B7N	572	418	448
PE 0303113N, AGSAG 4A6M	1,242	660	882

(U) RELATED RDT&E: (SEW) Architecture/Engineering Support program element is related to all Naval C4I related efforts.

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: OTH TARGETING

Exhibit R-3 Cost Analysis (page 2)												Date
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/4			PROGRAM ELEMENT 0604707N							PROJECT NAME AND NUMBER OTH Targeting X0798		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-01 Cost	FY-01 Award Date	FY-02 Cost	FY-02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Various	1468							Cont.	Cont.	Cont.
System Test and Evaluation	Various	Various	3648							Cont.	Cont.	Cont.
Systems Engineering	Various	Various	1076	514	TBD	520	TBD			Cont.	Cont.	Cont.
Interoperability Requirements	Various	Various	3266							Cont.	Cont.	Cont.
T & E Tools Development	Various	Various	137	152	TBD	152	TBD					
Systems Integration & Interoperability Testing (LBTN & SIE)	Various	Various	284	311	TBD	308	TBD					
Interoperability Validation	Various	Various	443	487	TBD	482	TBD					
Joint Interoperability	Various	Various	377	412	TBD	405	TBD					
Testing OTH-T Systems	Various	Various	194	213	TBD	245	TBD					
Subtotal T&E			10893	2089		2112				Cont.	Cont.	Cont.
Remarks												

R-1 Line Item No 92

PE/Project Cost Breakdown
(Exhibit R-3, page 10 of 26)

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: OTH TARGETING

Subtotal Management												
Remarks												
Total Cost			10893	2089		2112				Cont.	Cont.	Cont.

FY 2002 RDT&E,N Budget Item Justification DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: SEW ENGINEERING

(U) COST: (Dollars in Thousands)

NUMBER TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
X2144 SEW Engineering	8,142	12,043	8,469

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Space and Electronic Warfare (SEW) Engineering is a non-acquisition engineering effort defined as the neutralization or destruction of enemy targets and the enhancement of friendly force battle management through integrated employment and exploitation of the electromagnetic spectrum and the medium of space. SEW Engineering encompasses efforts to ensure that 1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the Naval C4ISR architecture as related to the National Defense Strategy and evolving joint visions and direction such as Joint Vision 2020, Joint Vision 2010, “Copernicus...C4ISR for the 21st Century,” “Forward…From the Sea,” C4I for the Warrior, and the Defense Science Board Summer Study Task Force Report on Information Architecture for the Battlefield, and are guided by CINC requirements; 2) the systems support emerging fleet requirements as documented and necessitated through concepts of Network Centric Warfare; and 3) the SEW systems and systems integration effort involves leading edge technology transfer of information processing technologies primarily through integration of government and commercial off-the-shelf (GOTS/COTS) products to enhance the Navy’s operational capability, interoperability, flexible reconfiguration, as well as reduce costs. SEW Engineering also provides the Navy support in the demonstration and integration of C4I systems developed by the services and by commercial vendors as part of the annual Joint Warrior Interoperability Demonstration (JWID) sponsored by the Joint Chiefs of Staff as directed by CJCSI 6260.1. Each JWID is designed to identify joint interoperability deficiencies, and to solicit solutions to these deficiencies from commercial industry and military RDT&E agencies. JWID demonstrates these technologies and architecture improvements, conducts an assessment by the joint warfighters and considers mature, low cost, systems/applications for rapid acquisition. Service

participants benefit from the exposure and training on new and existing new technologies, infrastructure improvements left behind from the demonstration, knowledge gained on joint and combined operations, and the assessment, selection, and acquisition of mature solutions to existing deficiencies.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($2,565) IAW CJCSI 6260.01, developed plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capabilities in key Commander in Chief priority areas and Joint Mission Area (JMA) Assessment Thrust Areas with a combined force structure into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans included high-capacity communications, improved Command and Control Warfare (C2W), integrated land fight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, combat identification, and multi-national task force architecture at sea. In conjunction with all services, assessed mature technologies and submitted recommendation for rapid acquisition of technologies that provide solutions to the warfighter's interoperability problems.

- (U) ($1,066) Continued Migration of the Overarching C4ISR Operational Requirements Documentation to a web-based, fully interactive, collaborative site, where requirements generators, systems developers, and other users requiring such data, could gain access to automated databases and accompanying tools. Produced the Strike thread for Operational Architecture. Continued support to the C4ISR portion of the Joint Technical Architecture/Standards development/documentation and implementation effort, and published periodic updates. Represented and coordinated Navy inputs into the Joint Technical Architecture developed in conjunction with both internal Naval and external service units and agencies including the ASD(C3I) Joint Technical Architecture (JTA) Development Group (JTADG). Navy inputs to the C4ISR portion of the JTA Version 3.0 were developed in accordance with direction from the Technical Architecture

Steering Group (TASG) and the DoD Architecture Coordination Council (ACC). Coordinated the C4ISR JTA standards and protocols with the DON CIO's Information Technology Standards Guidance (ITSG) document. Coordinated the implementation of JTA standards and protocols throughout the C4ISR systems development community. Provided appropriate design guidance and resulting data inputs into the Naval Architecture Database (NAD). Supported the maturation of the Levels of Information Systems Interoperability (LISI) constructs as they relate to the JTA.

- (U) ($893) Enhanced and refined the C4ISR Planned Systems Design for the Program Objectives Memorandum years. Continued to develop and validate a Naval C4ISR systems design environment to support Naval missions in a Joint and Coalition Theater. Architectural development consisted of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of battlegroup-wide and hull specific designs, (2) maintaining documentation describing the Systems Architectures/shipboard and ashore configurations, and (3) providing system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participated with the Joint Battle Center and Naval Battle Laboratories to verify and validate overall systems designs and detailed implementation designs. The decomposition of the overarching POM C4ISR Systems Architecture was accomplished. SPAWAR developed the functional design documents for Battle Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. These developed documents, coupled with control measures, allowed configuration management of installed designs. Sponsored and participated in related IPTs within the claimancy and throughout the Navy Department and DoD, and participated in OSD and joint architectural working groups and panels. Defined an end-to-end process model to document the C4ISR systems development process and relationships among the systems development components.

- (U) ($615) Augmented/updated/maintained the Overarching C4ISR Operational Requirements documentation. The composite operational capabilities of C4ISR systems were designed so that they conform to the Naval C4ISR architecture as it relates to the National Defense Strategy and evolving joint visions and

direction such as Joint Vision 2010, “Copernicus...C4ISR for the 21st Century,” “Forward…From the Sea”, C4I for the Warrior, and the Defense Science Board Summer Study Task Force Report on Information Architecture for the Battlefield, and are guided by CINC requirements. As part of the augmentation of the Operational Requirements documentation initial development of a technical insertion roadmap was developed with links into architecture and requirements. In order to track changes Platform Operational Requirements Documents were traced to UJTL and Naval Tactical Tasks for LPD17, LHD1, NSSN, and CVN77. This requirements traceability was produced in a database for better utilization. Additionally, an initial draft for C4ISR battlegroup support plan was prepared.

- (U) ($2,556) Developed the Navy’s common repository for architectural and interoperability support, data integration, and systems design data and information. As part of the repository, the Naval Architecture Database (NAD) encompassed the establishment and population of the dynamic systems model, analysis of the criteria and requirements for the operational system architecture functional transition, continuation of the population of the data models, update of the Hierarchical Data Dictionary.

- (U) ($447) Generated a web-based collaborative grid approach where programs/projects are synchronized across the claimancy/acquisition community. The draft product, based on web technology, allowed a matrix of capabilities to be mapped to organizations and products, leading to prioritized and scoped C4ISR work elements for claimancy pursuits.

2. (U) FY 2001 PLAN:

- (U) ($2,670) IAW CJCSI 6260.01, develop plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capabilities in key CINC priority areas, Joint Mission Area (JMA) Assessment Thrust Areas, and combined operations into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans will include high-capacity communications, improved Command and Control Warfare (C2W), integrated land fight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, and combat identification. Field demonstrated and assessed Joint Chief of Staff mandated Golden Nuggets Technologies that will benefit operational forces with their immediate employment at sea or in the field.

- (U) ($1,478) Implement a C4ISR-T Systems Design effort that is comprised of Battlegroup engineering design activities for Battlegroup deployment and new ship construction, integration of C4ISR systems throughout the Battlegroup, systems interfacing, and high level design across Battlegroup activities (Configuration Management, integration with training, logistics, spares, safety and EMI). Design activities include tactical shore systems, relationships of C4ISR systems to NMCI, and pier-side design and integration across the shore sites and the Fleet.

- (U) ($949) Continue the migration of the Overarching C4ISR Operational Requirements Documentation to a web-based, fully interactive, collaborative site, where requirements generators, systems developers, and other users requiring such data, can gain access to automated databases and accompanying tools. Continue support to the C4ISR portion of the Joint Technical Architecture/Standards development/documentation and implementation effort, and publish periodic updates. Represent and coordinate Navy inputs into the Joint Technical Architecture developed in conjunction with both internal Naval and external service units and agencies including the ASD(C3I) Joint Technical Architecture (JTA) Development Group (JTADG). Navy inputs to the C4ISR portion of the JTA Version 3.0 will be developed in accordance with direction from the Technical Architecture Steering Group (TASG) and the DoD Architecture Coordination Council (ACC).

- (U) ($776) Develop concept and evaluation alternatives to be explored as part of the CNO N6 Advanced Command & Control Wargame (AC2WG) series. Provide technical guidance and roadmaps that link AC2WG

concepts and Fleet Battle Experiments (FBE's) to evolving Naval C4ISR programs. Translate concepts and guidance into technical design requirements.

- (U) ($892) Enhance and refine the C4ISR Planned Systems Design for the POM years. Continue to develop and validate a Naval C4ISR systems design environment to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of battlegroup-wide and hull specific designs, (2) maintaining documentation describing the Systems Architectures/shipboard and ashore configurations; and (3) providing system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate overall systems designs and detailed implementation designs. The decomposition of the overarching POM C4ISR Systems Architecture will be accomplished. This involves breaking down the specifics of warfighter functions to lower levels of detail. From this, SPAWAR can develop the functional design documents for Battle Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. These developed documents, coupled with control measures, will allow configuration management of installed designs. Sponsor and/or participate in related IPTs within the claimancy and throughout the Navy Department and DoD, as required and participate in OSD and joint architectural working groups and panels. Define an end-to-end process model to document the C4ISR systems development process and relationships among the systems development components. Finally, the generation and analysis of a goal C4ISR integrated architecture that provides operational, system, and technical views for a notional Battle Group/Amphibious Ready Group in the future. The integrated architecture will follow the guidance of applicable DoD and DoN policies i.e. Operational, Systems and Technical Architectures as defined in the OSD DoD C4ISR Architecture Framework, Joint Technical Architecture, and Information Technology Standard Guidance. The goal architecture denotes integrated naval C4ISR system functionality that will help to guide future C4ISR system integration and interoperability. The Operational Architecture integrated architecture captures operational nodes, warfighter activities, system functions, interoperability standards, information exchange requirements (IERs), and performance attributes associated with the IERs.

- (U) ($707) Augment/update/maintain the Overarching C4ISR Operational Requirements documentation. The composite operational capabilities of C4ISR systems must be designed so that they conform to the Naval C4ISR architecture as it relates to the National Defense Strategy and evolving joint visions and direction, such as Joint Vision 2020, Joint Vision 2010, “Copernicus...C4ISR for the 21st Century,” “Forward…From the Sea”, C4I for the Warrior and are guided by CINC requirements. As operational requirements change, either through changes in mission, technological change, technical insertion into systems, or through systems integration efforts, these changes must be reflected in all applicable requirements documents. Additionally, support to related C4ISR projects as they define and maintain Theater and Battleforce C4ISR architectures must be maintained. Also, integrate future Naval C4ISR capabilities within migration plans and roadmaps linked to operational requirements documentation. Finally, assist OPNAV in REQ/BAM support for the development of warfighter C4ISR requirements. These requirements are defined by both OPNAV and the Fleet. The products include the support for requisite Baseline Assessment Memoranda, Copernicus Requirements Working Group statements of Fleet requirements, the generation of a SMIDB or like requirements functional traceability matrix from the Fleet based on requirements documents (ORDs, MNS, etc.) and IWARS inputs.

- ($571) Continue development of the web-based collaborative grid approach where programs/projects are synchronized across the claimancy/acquisition community. The shift for the afloat part of the Navy, from platform-centric warfare to network-centric warfare, and the Naval Intranet for the land-based portion of the Navy, demands that new approaches are identified, matured, and tested with the warfighters and systems developers. The product will be a validated and modeled methodology, based on web technology, whereby a matrix of capabilities are mapped to organizations and products, leading to prioritized and scoped C4ISR work elements for claimancy pursuits. This web site will contain the results of technology insertion experiments and “lessons learned” from those trials, so that successes can be applied to similar systems enhancement attempts. Included will be software reuse experiments, hardware applications, and networking trials.

3. (U) FY 2002 PLAN:

- (U) ($2,666) IAW CJCSI 6260.01, Develop plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas with a combined force structure into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans will include high-capacity communications, improved Command and Control Warfare (C2W), integrated land fight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, combat identification, and multi-national task force architecture at sea. In conjunction with all services, assess mature technologies and submit recommendation for rapid acquisition of technologies that provide solutions to the warfighter's interoperability problems.

- (U) ($772) NMCI reimbursable funding.

- (U) ($416) Implement a C4ISR-T Systems Design effort that is comprised of Battlegroup engineering design activities for Battlegroup deployment and new ship construction, integration of C4ISR systems throughout the Battlegroup, systems interfacing, and high level design across Battlegroup activities (Configuration Management, integration with training, logistics, spares, safety and EMI).

- (U) ($395) Develop concept and evaluation alternatives to be explored as part of the CNO N6 Advanced Command & Control Wargame (AC2WG) series. Provide technical guidance and roadmaps that link AC2WG concepts and Fleet Battle Experiments (FBE’s) to evolving Naval C4ISR programs. Translate concepts and guidance into technical design requirements.

- (U) ($1,168) Enhance and refine the C4ISR Planned Systems Design for the POM years. Continue to develop and validate a Naval C4ISR systems design environment to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of battlegroup-wide and hull specific designs, (2) maintaining documentation describing the Systems Architectures/shipboard and ashore configurations; and (3) providing system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate overall systems designs and detailed implementation designs. The decomposition of the overarching POM C4ISR Systems Architecture will be accomplished. This involves breaking down the specifics of warfighter functions to lower levels of detail. From this, SPAWAR can develop the functional design documents for Battle Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. These developed documents, coupled with control measures, will allow configuration management of installed designs. Sponsor and/or participate in related IPTs within the claimancy and throughout the Navy Department and DoD, as required and participate in OSD and joint architectural working groups and panels. Define an end-to-end process model to document the C4ISR systems development process and relationships among the systems development components. Finally, the generation and analysis of a goal C4ISR integrated architecture that provides operational, system, and technical views for a notional Battle Group/Amphibious Ready Group in the future. The integrated architecture will follow the guidance of applicable DoD and DoN policies i.e. Operational, Systems and Technical Architectures as defined in the OSD DoD C4ISR Architecture Framework, Joint Technical Architecture, and Information Technology Standard Guidance. The goal architecture denotes integrated naval C4ISR system functionality that will help to guide future C4ISR system integration and interoperability. The Operational Architecture integrated architecture captures operational nodes, warfighter activities system functions, interoperability standards, information exchange requirements (IERs), and performance attributes associated with the IERs.

- (U) ($525) Augment/update/maintain the Overarching C4ISR Operational Requirements documentation. The composite operational capabilities of C4ISR systems must be designed so that they conform to the Naval

C4ISR architecture as it relates to the National Defense Strategy and evolving joint visions and direction, such as Joint Vision 2020, Joint Vision 2010, "Copernicus...C4ISR for the 21st Century," "Forward…From the Sea", C4I for the Warrior and are guided by CINC requirements. As operational requirements change, either through changes in mission, technological change, technical insertion into systems, or through systems integration efforts, these changes must be reflected in all applicable requirements documents. Additionally, support to related C4ISR projects as they define and maintain Theater and Battleforce C4ISR architectures must be maintained. Also, integrate future Naval C4ISR capabilities within migration plans and roadmaps linked to operational requirements documentation. Finally, assist OPNAV in REQ/BAM support for the development of warfighter C4ISR requirements. These requirements are defined by both OPNAV and the Fleet. The products include the support for requisite Baseline Assessment Memoranda, Copernicus Requirements Working Group statements of Fleet requirements, the generation of a SMIDB or like requirements functional traceability matrix from the Fleet based on requirements documents (ORDs, MNS, etc.) and IWARS inputs.

- (U) ($1,398) Establish data and information architectures to be utilized in development of network architectures for Navy Marine Corp Intranet (NMCI). Effort to include development of NMCI Global Directory services, NMCI Global Knowledge Portal and data integration toolset for Navy IT. Design activities include tactical shore systems, relationships of C4ISR systems to NMCI, and pier-side design and integration across the shore sites and the Fleet.

- (U) ($1,129) Continue development of the web-based collaborative grid approach where programs/projects are synchronized across the claimancy/acquisition community into Global Information Grid (GIG). The shift for the afloat part of the Navy, from platform-centric warfare to network-centric warfare, and the Naval Intranet for the land-based portion of the Navy, demands that new approaches are identified, matured, and tested with the warfighters and systems developers. The product will be a validated and modeled methodology, based on web technology, whereby a matrix of capabilities are mapped to organizations and products, leading to prioritized and scoped C4ISR work elements for claimancy pursuits. This web site will contain the results of technology insertion experiments and "lessons learned" from those trials, so that successes can be applied to similar systems enhancement attempts. Included will be software reuse experiments, hardware applications, and networking trials.

B. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: SEW ENGINEERING

Exhibit R-3 Cost Analysis (page 1)												Date
APPROPRIATION/BUDGET ACTIVITY 4		RDT&E,N	PROGRAM ELEMENT 0604707N									PROJECT NAME AND NUMBER SEW Engineering X2144
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-01 Cost	FY-01 Award Date	FY-02 Cost	FY-02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Subtotal Product Development												
Remarks:												
SEW/C4I Technology Integration	Various	Various	4554							0	4554	4554
Systems A&E and Validation	Various	Various	12985							0	12985	12985
C4ISR/C4ISR-T Systems Design/Capablilities*	Various	Various	5091	2941	TBD	4111	TBD			Cont.	Cont.	Cont.
C4ISR Operational Requirements	Various	Various	2773	1656	TBD	525	TBD			Cont.	Cont.	Cont.
AC2WG	Various	Various		776	TBD	395	TBD			Cont.	Cont.	Cont.
Project R230				36								
NMCI Reimbursable funding	Various	Various				772					Cont.	Cont.
Information Repository/Naval Architecture Database	Various	Various	4544							0	4544	4544

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PE/Project Cost Breakdown
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FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: SEW ENGINEERING

Subtotal Support	Various	Various	29947	5409		5803				Cont.	Cont.	Cont.

Remarks:

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: SEW ENGINEERING

Exhibit R-3 Cost Analysis (page 2)												Date
APPROPRIATION/BUDGET ACTIVITY RDT&E,N 4			PROGRAM ELEMENT 0604707N									PROJECT NAME AND NUMBER SEW Engineering X2144
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-01 Cost	FY-01 Award Date	FY-02 Cost	FY-02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
SEW Engr/JWID	Various	Various	7522	2670	TBD	2666	TBD			Cont.	Cont.	Cont.
Subtotal T&E	Various	Various	7522	2670	TBD	2666	TBD			Cont.	Cont.	Cont.
Remarks												
Subtotal Management												
Total Cost			37469	12043		8469				Cont.	Cont.	Cont.

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PE/Project Cost Breakdown
(Exhibit R-3, page 25 of 26)

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

FY 2002 RDT&E,N Budget Item Justification DATE: JUNE 2001

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

(U) COST: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R2357 Maritime Battle Center	22,295	23,618	21,678

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The mission of the Maritime Battle Center (MBC) is to execute the Naval Warfare Innovation Process. The process takes concepts developed by the Strategic Studies Group and approved by the Chief of Naval Operations into Fleet Battle Experiments; conducts preliminary sub-scale experiments and technological demonstrations focused on the advanced engineering and operational system development of systems related to all conflict levels of Littoral Battlespace. The MBC environment is a network centric environment that links the existing “core” Naval facilities to the Marine Corps Warfighting Lab (MCWL), the Joint Battle Center/Federated Battle Lab, and technologists in industry and academia. The MBC is essential to the evolution of combat capabilities since it is the engine for validating the new network centric warfare techniques in conjunction with the Sea Based Battle Laboratories (SBBL), Science & Technology (S&T) initiatives and other initiatives that originate with the operating forces. The MBC supports the early and sustained involvement of Joint Warfighters in refining the technology to meet the tactics, techniques, and procedures needed for 2010-2020 Littoral Battlespace. The MBC will have multiple roles since it is a crosscutting organization involved in several facets of concept, platform, weapons, weapon systems and Information Technologies (IT),Information System (IS) and Information Management (IM) systems development and integration. These include collaborative planning, operational experimentation planning and execution, technology transition/acquisition support, systems engineering, and integration, technology assimilation and operational demonstrations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS

- (U) ($4,400) Fleet Battle Experiment (FBE) Analysis and Core Support: The management and administration of MBC activities included oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entailed the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting CINCs, and technologists from industry and academia.

- (U) ($3,600) Enabling Technical Development: Prior to transitioning any technology to Fleet Commanders during a FBE or Limited Objective Experiment (LOE), technology needs preliminary engineering experimentation to determine its compatibility and compliance with the Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of high performance and interoperability issues. The objectives of these preliminary experiments was to bring information superiority to Fleet operations while achieving a level of critical mass in the early identification of technologies with “production” potential. These technologies included commercially developed technologies in collaborative planning, interactive sharing, the correlation of decision data-reducing “decision time, and the exploration of dynamically managed circuits operating in sea, ground, and/or aerospace domains.

- (U) ($13,429) FBE Direct Experimentation: The Numbered Fleet Commanders are designated experimentation leads for FBEs and LOEs. The Fleet Commander in the Area of Responsibility where the experiment is held will lead the FBE series and designate their flagship as Sea Based Battle Laboratories (SBBL) that will work with the MBC Director in the conduct of the FBE. This enables the Fleet to directly participate in the development of future Navy concepts and capabilities and provides the Fleet an opportunity to provide immediate feedback to the technologist and concept developer.

- (U) ($1,376) Technical Evaluation: MBC planned and participated in the planning of other services and joint

commands of exercises and tests that involved the Navy experimentation process. Its core competency was fleet operations, exercise designs, costing, equipping and exercise analysis, and overall evaluations with recommendations for future related activities. The technical operations also evaluated the results of Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), and Joint Battle Center (JBC) activities and determined the most expeditious paths to transition such concepts into actual and sustainable Naval warfighting capability. As promising innovative technologies emerged from the commercial sector, the technical operations element devised insertion strategies for prototypes. Using existing resources, the components needed to provide the required set of capabilities were generated and brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies were tasked dependent on the requirements. Knowledge of laboratory capabilities and projected needs of such laboratories are inherent in this support. Joint exercise support supplied by maritime forces were coordinated using this organizational function.

2. (U) FY 2001 PLAN:

- (U) ($4,788) FBE Analysis and Core Support: The management and administration of MBC activities includes oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entails the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting CINCs, and technologists from industry and academia.

- (U) ($3,187) Enabling Technical Development: Prior to any technology transition to the Numbered Fleet Commanders during a Fleet Battle Experiment (FBE) or Limited Objective Experiment (LOE). The technology needs preliminary engineering experimentation to determine its compatibility and compliance with the Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of high performance and interoperability issues. The objectives of these preliminary experiments is to bring information superiority to Fleet operations while achieving a level of critical mass in the early identification of technologies with “production” potential. These technologies include commercially developed technologies in collaborative planning, interactive sharing, the correlation of decision data-reducing “decision time, and the exploration of dynamically managed circuits operating in sea, ground,

and/or aerospace domains.

- (U) ($14,341) FBE Direct Experimentation: The Numbered Fleet Commanders are designated experimentation leads for FBEs and LOEs. The Fleet Commander in the AOR where the experiment is held will lead the FBE series and designate their flagship as Sea Based Battle Laboratories (SBBL) that will work with the MBC Director in the conduct of the FBE. This enables the Fleet to directly participate in the development of future Navy concepts and capabilities and provides the Fleet an opportunity to provide immediate feedback to the technologist and concept developer.

- (U) ($1,302) Technical Evaluation: MBC will plan and participate in planning by other services and joint commands of exercises and tests that involve the Navy experimentation process. Its core competency will be fleet operations, exercise designs, costing, equipping and exercise analysis and overall evaluations with recommendations for future related activities. The technical operations will also evaluate the results of Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), and Joint Battle Center (JBC) activities and determine the most expeditious paths to transition such concepts into actual and sustainable Naval warfighting capability. As promising innovative technologies emerge from the commercial section, the technical operations element will devise insertion strategies for prototypes. Using existing resources, the components needed to provide the required set of capabilities will be generated and brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies will be tasked dependent on the requirements. Knowledge of laboratory capabilities and projected needs of such laboratories will be inherent in this support. Joint exercise support supplied by maritime forces will also be coordinated using this organizational function.

- (U) ($206) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

- (U) ($4,283) FBE Analysis and Core Support: The management and administration of MBC activities includes oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entails the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting CINCs, and technologists from industry and academia.

- (U) ($2,598) Enabling Technical Development: Prior to any technology transition to the Numbered Fleet Commanders during a Fleet Battle Experiment (FBE) or Limited Objective Experiment (LOE). The technology needs preliminary engineering experimentation to determine its compatibility and compliance with the Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of high performance and interoperability issues. The objectives of these preliminary experiments is to bring information superiority to Fleet operations while achieving a level of critical mass in the early identification of technologies with “production” potential. These technologies include commercially developed technologies in collaborative planning, interactive sharing, the correlation of decision data-reducing “decision time, and the exploration of dynamically managed circuits operating in sea, ground, and/or aerospace domains.

- (U) ($13,887) FBE Direct Experimentation: The Numbered Fleet Commanders are designated experimentation leads for FBEs and LOEs. The Fleet Commander in the AOR where the experiment is held will lead the F|BE series and designate their flagship as Sea Based Battle Laboratories (SBBL) that will work with the MBC Director in the conduct of the FBE. This enables the Fleet to directly participate in the development of future Navy concepts and capabilities and provides the Fleet an opportunity to provide immediate feedback to the technologist and concept developer.

- (U) ($910) Technical Evaluation: MBC will plan and participate in planning by other services and joint commands of exercises and tests that involve the Navy experimentation process. Its core competency will be fleet operations, exercise designs, costing, equipping and exercise analysis and overall evaluations with recommendations for future related activities. The technical operations will also evaluate the results of

Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), and Joint Battle Center (JBC) activities and determine the most expeditious paths to transition such concepts into actual and sustainable Naval warfighting capability. As promising innovative technologies emerge from the commercial section, the technical operations element will devise insertion strategies for prototypes. Using existing resources, the components needed to provide the required set of capabilities will be generated and brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies will be tasked dependent on the requirements. Knowledge of laboratory capabilities and projected needs of such laboratories will be inherent in this support. Joint exercise support supplied by maritime forces will also be coordinated using this organizational function.

B. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: R2357
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: MARITIME BATTLE CENTER

Exhibit R-3 Cost Analysis (page 1)												Date
APPROPRIATION/BUDGET ACTIVITY RDT&E,N			PROGRAM ELEMENT 0604707N									PROJECT NAME AND NUMBER Maritime Battle Center R2357
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-01 Cost	FY-01 Award Date	FY-02 Cost	FY-02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	Various	Various	30454	18830	Various	17395	Various			CONT	CONT	CONT
Subtotal T&E			30454	18830		17395				CONT	CONT	CONT
Remarks												
Program Management	Various	Various	5941	4788	Various	4283	Various			CONT	CONT	CONT
Subtotal Management			5941	4788		4283				CONT	CONT	CONT
Remarks												
Total Cost			36395	23618		21678				CONT	CONT	CONT

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PE/Project Cost Breakdown
(Exhibit R-3, page 33 of 26)

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE CENTER

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: R2357
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT TITLE: MARITIME BATTLE CENTER

Exhibit R-3 Cost Analysis (page 2)												Date
APPROPRIATION/BUDGET ACTIVITY RDT&E,N			PROGRAM ELEMENT 0604707N									PROJECT NAME AND NUMBER Maritime Battle Center R2357
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-01 Cost	FY-01 Award Date	FY-02 Cost	FY-02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Subtotal Product Development												
Remarks:												
Subtotal Support												

R-1 Line Item No 92

PE/Project Cost Breakdown
(Exhibit R-3, page 35 of 26)

FY 2002 RDT&E,N Program Element/Project Cost Breakdown DATE: JUNE 2001

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N

PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: R2357

PROJECT TITLE: MARITIME BATTLE CENTER

Remarks